THE EFFECT OF WEB SEARCH STRATEGY ON ONLINE PURCHASE INTENTION: A WEB DESIGN ELEMENT-RELATED COST-BENEFIT APPROACH

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SUMMARY

This study investigates the effect of Web search strategy on online purchase intention. It examines how Web search strategies influence the seekers' perceived Web search benefit (or PWSB) and perceived Web search cost (or PWSC) manifested as the perceived motivators and hygiene factors of Web design elements. It also investigates whether user Internet experience moderates the relationship between Web search strategy and PWSB and PWSC. This study emphasizes the interaction between users and a Website as information source. The interaction between users and a Website may lead to the situation where users having "felt involvement" with the Web search activity. As such, user involvement, as another term of felt involvement, plays an important role in the proposed research model, and it is operationalized accordingly.

This study seeks the answers to one main research question: "*How does Web search strategy affect online purchase intention*?" This main research question is divided into smaller questions:

1. How different Web search strategies affect PWSB and PWSC?
2. How PWSB and PWSC affect user involvement?
3. How does user involvement affect user satisfaction, user attitude, and online purchase intention?

The theory of economic exchange is used as an aid for developing the research model and the corresponding. Background theories on information seeking models and strategies are also reviewed, as well as the mental model theory. In addition, the Theory of Reasoned Action, the Theory of Planned Behavior, and the Expectancy

Theory play an important role in helping this study to explain the relationship among other constructs. A review of previous studies helps this study to identify Web design elements that can be grouped into the seekers' PWSB and its corresponding cost.

A laboratory experiment followed by a post-experiment survey was conducted to answer the above questions. Subjects were undergraduate students from six different faculties, comprises 235 students (121 male and 114 female). During the experiment, they were grouped into planned group and unplanned group. The independent variable was Web search strategy. Web search strategy was also acting as a moderating variable along with user Internet experience. The dependent variables were PWSB, PWSC, user involvement, user attitude toward online purchase, user satisfaction, and online purchase intention.

The major findings of this study are:

1. Subjects who strictly followed a search plan (the PG group) perceived less Web search benefit compared to those who did not follow any search plan. On the other hand, seekers who strictly followed a search plan (the UPG group) perceived more Web search cost compared to those who did not follow any search plan
2. There is no significant relationship between user involvement and online purchase intention.
3. The effect of PWSB on user involvement, and user involvement on attitude toward online purchase in the PG group is weaker compared to that in the UPG group.
4. The effect of user involvement on user satisfaction, and attitude on intention, for the PG group is stronger than that in the UPG group.

5. There is no different in the strength of the effect of PWSC on user involvement in both groups.
6. The effect of user satisfaction and online purchase intention was sensitive upon the subjects' search strategy, that is, it is significant for the UPG group but not for the PG group.
7. Higher user Internet experience increases the gap in PWSB and PWSC for different subjects who employed different Web search strategies.

The above findings suggest that there is a different effect size of Web search strategy on online purchase intention. The fact that there is no significant relationship between user involvement and online purchase intention is due to the operationalization of user involvement construct.

Based on the above findings, several recommendations to Web designer are proposed. Theoretical, practical, and empirical implications are also discussed. Limitations as well as the direction for future studies are also mentioned.

Chapter 1

INTRODUCTION

The World Wide Web (Web) is a vast collection of interconnected documents. Its foundation is based on the concept of hypertext, the Internet, and multimedia (Rumpradit and Donnell 1999). The Web provides individuals with the potential to access large and complex information sources. It provides users with search capabilities to locate necessary information needed in making a purchase decision. It also opens up huge business opportunities to its users (Ho and Wu 1999).

With regards to online business, Jupiter Research (2002) reported that total online consumer commerce spending in Europe will reach €80 billion by 2007, up from €20 billion in 2002. According to this report, Portugal will show compound annual growth rate (CAGR) of 45% of the total online spending; it is the highest among European countries. In an information technology market forecast, Nomura Research Institute Ltd. (2005) reported that in Japan alone, business-to-costumer (B2C) electronic commerce is expected to double in five years to 5.51 trillion yen. The domestic Internet auction market is also projected to double from 1.08 trillion yen in fiscal 2004 to 2.08 trillion yen in fiscal 2009 ending in March 2010.

Several reasons have been cited as to why people are doing business online, for both selling and purchasing products. One of the main reasons is convenience (McKinney et al. 2002). However, Rose et al. (1999) have warned about the technological impediments that may hamper the growth of online business.

Online consumer has a double-role, i.e. as a computer user and as a traditional shopper (Koufaris et al. 2002). As a computer user, a consumer is most likely to have an online experience by means of the Internet. As a traditional shopper, there is a

possibility that he has purchased products online as well. Whether he purchases offline or online, his purchasing behavior could have been preceded by information search to look for relevant information to support his purchase decision (Engel et al. 1986, Liang and Lai 2002).

According to the framework proposed by Li and Zhang (2002), several steps or processes must be taken before online purchase is committed. Online purchase might be committed after customers went through some sort of decision-making process that was preceded by having high intention to purchase online. Under this framework, and also based on the Theory of Reasoned Action, or TRA (Fishbein and Ajzen 1975, Ajzen and Fishbein 1980) and the Theory of Planned Behavior, or TPB (Ajzen 1991), intention to purchase online is influenced by customers' attitude toward online purchase. High level of attitude enhances customers' intention to buy. Attitude is influenced by customers' internal and external factors. Internal factors include personal characteristics and motivation. External factors include online store design that will strongly affect attitude toward online purchase (e.g. Song and Zahedi 2001, Li and Zhang 2002).

The Expectation Confirmation Theory, or ECT, (Oliver 1980) posits that user satisfaction is an antecedent of behavioral intention. Several empirical studies confirmed this relationship. Bhattacherjee (2001a, 2001b) showed that consumers' continuance intention with an electronic commerce service is determined by their satisfaction with the previous service. Satisfaction with the Website design also plays an important role to enhance revisit intention (e.g. Lin et al. 2005, Galletta et al. 2004).

It was mentioned that before committing to purchase online, customers must go through some sort of decision-making (Li and Zhang 2002). Information is needed

to start and to support the decision making process. This is to imply that customers must engage in information seeking activity, whether it is offline or online. The needed information could be in the form of textual information related to the products and/or the look and feel of the products under consideration. However, online consumers cannot depend on all five senses to gather all the information needed to support the decision making process. Instead, they are more likely to rely on their perception about the products and their related information they see on a Website. As such, success of online shopping depends on Website's interface and how people interact with computers (Hoque and Lohse 1999). The user interface used in a Website is an essential link between retail stores and their customers (Lohse and Spiller 1999), and Website contents may influence user involvement (Sproull et al. 1996).

The Internet is a jungle of information where individuals can find a huge variety of information. The volume of information on the Internet keeps growing as every individual has every right to put any information they want other people to read. The ever-increasing amount of information on the Web creates problems for individuals who try to find information on the Internet. The problems came from the fact that Web search engines are designed to support only one type of information-seeking strategy, i.e. specifying queries by using terms to select documents from the database (Xie 2000). The ineffectiveness of search engines' filtering system causes users to rely heavily on browsing (Hsieh-Yee 1998). This situation creates uncertainty and forces individuals to gamble on their choice of location to start looking for the information of interest (Blackshaw and Fischhoff 1988).

To overcome this limitation, online consumers often have to go back and forth between pages to find information of interest. On one hand, besides getting the

intended information, they may get other related important information. On the other hand, they may not be able to get anything at all. In the first case, consumers get some sort of benefits in return for their time browsing the Internet. In the second case, consumers get nothing, but have lost at least their precious time without getting any benefit. These situations may influence consumers' intention to purchase products online.

The above elaboration shows that Web surfing activity is bounded by a cost-benefit analysis. When surfing a Website, surfers may obtain some benefits, e.g. knowing that new products have been released in the market, and incur costs, e.g. time. Surfing benefits and costs may also be attributed to the way the Web is designed, thus related to the Web design factors. For example, slow download speed may be due to the slow Internet connection, but may also be due to the need to download many images, not to mention the size of each image itself.

Motivated by the above concern, the purpose of this study is to shed light on how Web design factors can be assessed as the benefits and costs that online consumers obtain or perceive during their online activities. A consequent goal is to use this result to assess consumer involvement, attitude, satisfaction, and intention to purchase online.

As an aid to this study, we borrow the theory of economic exchange to argue that Web search activity could have been a case of a mutually beneficial exchange. If Web search activity lead to purchase behavior, then such behavior has an evolutionary basis and is not entirely the results of uneven power by either the Web searcher or the Web owner. Web search activity would not be possible without the Web owner provides information at the first place. Although the focus of this study is on the effect of Web search strategy on purchase intention, the theory of economic exchange

is generally useful in organizing thinking about why the exchange happens, i.e. in term of the benefit and cost of the exchange.

According to economic exchange, to promote voluntary and non-obligating exchanges of services and goods between actors, an important element must exist, i.e. trust (Ring 1996, Uzzi 1996). According to Uzzi (1996), trust increases an individual's access to resources. Trust is "the distinguishing characteristics of a personal relationship" (p. 678). Trust can be built based on the credibility of the other party. In a Website design, several elements can be used to show the credibility of the company who owns such a Website. The discussion about how certain Website design elements can be used to show the company's credibility is presented in the literature review.

1.1. Definition

This subsection presents definition of several terms that will be used throughout this thesis. Besides, it is necessary to mention earlier that the word of user, customer, consumer, and individual are interchangeable, and they are synonyms.

1.1.1 What is Information?

The word "information" refers to different concepts. In daily usage, information is often interchangeably used with other terms such as data, record, database, etc. It is also referred to as a piece of knowledge being transferred or communicated to other parties. Most generally, information is anything that can change an individual's knowledge (Marchionini 1995). Buckland (1991) distinguishes information according to different uses (p. 43):

- Information-as-process, the process of being informed.

- Information-as-knowledge, this is imparted when someone becomes informed.
- Information-as-thing, physical objects such as data and documents that are referred to attributively as information because they are regarded as being informative, as having the quality of imparting knowledge or communicating information, instructive.

Meadow et al. (2000) give an operational definition of information. They define information as, “data that changes the state of a system that perceives it, whether a computer or a brain; hence, a stream of data that does not change the state of its receiver is not information” (p. 37). From this definition, it is clear that information can become obsolete, that is when individuals receive the same information repeatedly, or when individuals perceive that the data that is supposed to be informative is in fact meaningless.

1.1.2 Types of Information Needs

Seekers visit an information source, e.g. a Website, to gather information to help them in solving their problems. Andrew and Dixon (2003, pp. 222-227) identified a range of types of information needs pertaining to youngster that have similarities with those of the customers:

- *Advice*: guidance on a course of action is sought
- *Spontaneous ‘life situation’ information*: factual information is sought in response to a problem or curiosity arising in everyday life

- *Personal information*: seekers seek mainly factual information pertaining to themselves, protagonists in their immediate social world or events within that community
- *Affective support*: seekers need this kind of information when they seek emotional reassurance and sympathy, usually in relation to a particular event. In affective support, no guidance was sought.
- *Support for skill development*: seekers need this kind of information to improve their skill.
- *Interest-driven information*: seekers seek this type of information to support their personal interests.
- *Self-development information*: information of this kind is of a factual nature and was required by seekers to make plans for their futures.
- *Preparatory information*: seekers seek information to prepare themselves for a forthcoming challenge.
- *Reinterpretations and supplementations*: seekers need more meaningful reworking of information already known to them.
- *Verificational information*: seekers need this information to corroborate existing suspicions or beliefs.

1.1.3 Information Providers and Information Seekers

The Web is virtually open to everybody who is interested to post, and to get, information. The vast collection of information available on the Internet is possible because more people contribute information. The availability of the faster Internet connection, ease of use, and convenience in getting information from the Internet, results in the situation where the Internet becomes a primary source of information to

many people. This situation suggests a synergy between those who provide information on the Internet and those who "harvest" it for whatever reasons. As the Internet is virtually open to everybody, the same individual could be a provider at one time and a seeker at some other time. Thus, the distinction between information provider and information seeker is conceptual.

1.1.4 Online Purchase Intention

Intention is a determination to act in a certain way (http://www.webster.com). It is an immediate determinant of any behavior that an individual would like to perform (Ajzen and Madden 1997). The usual assumption is that "the more favorable a person's attitude toward some object, the more he will intend to perform positive behavior (and the less he will intend to perform negative behaviors) which respect to that object," (Fishbein and Ajzen 1975, pp. 288). In line with this definition, for the purpose of this study, online purchase intention is defined as the degree to which a customer is inclined to purchase a product or service from a Website (van der Heijden et al. 2001).

1.1.5 Benefit and Cost

Resources must be spent when users surf the Internet with the hope that they can get something in return. In economic term, users' activity is bounded by a cost-benefit analysis. In the context of online activity, a cost-benefit analysis is a type of analysis that involves comparing the relative costs of online activity to the benefit it generates (http://www.synergyaids.com/lacriaids/glossarysp.asp).

Benefit is "a product attribute expressed in terms of what the user gets from the product rather than its physical characteristics or features. Benefits are often

paired with specific features, but they need not be. They are perceived, not necessarily real" (http://www.shapetomorrow.com/resources/b.html). This definition implies that the benefit could be in the form of tangible or intangible goods. Cost is "a value measured by what must be given or done or undergone to obtain something" (http://www.cogsci. princeton.edu/cgi-bin/webwn). The cost could also be in the form of tangible or intangible goods.

Several benefits of information search have been identified, including enjoyment, self-confidence, and role (Beatty and Smith 1987), improvement in human capital, e.g. knowledge and time management skills (Urbany et al. 1996, Berné et al. 2001). On the other hand, the incurred cost is mostly related to the communication cost and time cost (Sugara et al. 2000), felt time pressure (Putrevu and Ratchford 1997), difficulties in online stores comparison and mobility (Urbany et al. 1996, Berné et al. 2001). For this study, the cost-benefit analysis of information seeking will be related to the Web design elements the users perceive during their information seeking activity.

1.2 Related Works

This study focuses on information seeking, online purchase intention, Web design, and affective feelings related to online activity. This subsection presents various related studies on the above topics to identify the gaps in the literature that this study is trying to bridge.

1.2.1 Previous Works on Purchase Intention

Several factors and past activities have been identified to influence purchase intention. Table 1.1 shows a summary of related studies to observe factors influencing

purchase intention both directly and indirectly. This table shows that most factors affecting purchase intention can be related to Web design.

1.2.2 Previous Works on Web Design Factors and Quality

Studies that investigate the Web design success factors have also been conducted quite frequently. With several limitations in hand, it can be understood that one study has different emphasis compared with the rest. Table 1.2 shows several of these studies. This is not meant for an exhaustive list, but rather to show the different emphasis of those studies.

1.2.3 Previous Works on Information Seeking Models

Individuals often in urge to find information of interest. Marchionini (1995) defines information seeking as “a process in which humans purposefully engage in order to change their state of knowledge” (p. 5). This process is both systematic and opportunistic. In order to understand how information seeking proceeds, several information-seeking models have been proposed and empirically tested (Table 1.3).

By reviewing the related studies presented in Table 1.1 and Table 1.2, several gaps in the literature can be identified:

- Several studies on the factors affecting online purchase have been conducted (see Table 1.1). Trust, risk, and related factors like corporate credibility, privacy and security, are the most common factors affecting online purchase. Other factors like website background, web usability, previous experience, and consumer familiarity have also been investigated. However, no attempt has been made to study whether the combination of these factors affect purchase intention the same as individual factor does.

This study attempts to investigate whether a combination of these factors, reflected as Web design factors that are perceived as the Web searching benefits and costs, influences user intention to purchase.

- The majority of the studies on Web design factors and quality as shown in Table 1.2 emphasizes technical aspect, navigation easiness, screen layout design, and content quality. These design factors make the Website serviceable and interesting. However, except Liu and Arnett (2000), and Huizingh (2000), they mostly lack of the "fun factor" that may motivate users to prolong their visits and to differentiate them from those that turn the users off. There is no study emphasizing the benefits, related to Web design factors, the users get or perceive from visiting a Website, nor on the incurred costs. Therefore, this study focuses on a cost-benefit analysis related to the Website design factors.
- There is limited number of studies that investigate how information seeking activity influences online purchase intention. A study by Teo and Yeong (2003) shows that perceived benefits of search directly affect deal evaluation, which in turn influences purchase intention. Another study by Muthitacharoen et al. (2002) shows that perceived ease of use and perceived usefulness of Web technology have indirect impact on online purchase intention. However, these studies fail to show that certain seeking strategy affects purchase intention. This study attempts to fill this gap by investigating the effect of Web search strategy on purchase intention.

Motivated by the above situations, research questions are proposed in the following section.

Table 1.1 Partial lists of the previous works on purchase intention.

Study by	Methodology	Subjects	Factors affecting purchase intention
Kavanoor et al. (1997)	Experiments	105 upper business students	Advertising format and advertising credibility
Lafferty and Goldsmith (1999)	Factorial design	100 undergraduate marketing students	Corporate credibility
da Costa et al. (2000)	Factorial design	65 respondents from different occupations and educational backgrounds	Price, image, brand name
Jarvenpaa et al. (2000)	Experiential survey	184 undergraduate and MBA students	Store size, store reputation, trust, risk
Miyazaki and Fernandez (2000)	Websites examination	381 commercial websites	Privacy and security
Stevenson et al. (2000)	Experiment	30 students	Website background
Chan (2001)	Door-to-door personal interview survey	300 households	Ecological knowledge, ecological affect, collectivism, man-nature orientation
Shim et al. (2001)	Mail survey	2000 household with PC	Previous purchase experience
Song and Zahedi (2001)	Survey	121 participant	Website design comprises promotion, service, informational influence, self efficacy, resource facilitation
Söderlund (2002)	Scenario-based survey	140 students	Consumer familiarity (# of purchase-related experience)
van der Heijden et al. (2003)	Survey	228 potential online customers	Trust, risk, perceived ease of use, usefulness
Konradt et al. (2003)	Experiment	60 participants	Web usability, trust, perceived store size
van der Heijden and Verhagen (2004)	Experiment	312 undergraduate students	Online store image comprises online store ease of use, usefulness, store style, familiarity, trustworthiness, and settlement performance

Table 1.2 Summary of related studies on Web design factors and quality.

Study by	Web design factors and quality
Aladwani and Palvia (2002)	Specific content, content quality, appearance and technical adequacy
Barnes and Vidgen (2001)	Information quality, interaction quality, and site design quality
Bell and Tang (1998)	Accessibility, content, graphics, structure, user friendliness, navigation, usefulness, unique features, online transaction, and site usage fee
Calongne (2001)	Audience, category, content
Cox and Dale (2002)	Ease of use, customer confidence, on-line resources, and relationship services
Ho (1997)	Quality: timely, custom, logistic, sensational Content: promotion, provision, processing
Huizingh (2000)	Content: transaction-related features, entertaining, content differences for different applications Design: quality of navigation structure, multimedia capabilities, presentation style
Liu and Arnett (2000)	Information and service quality, system use, playfulness, system design quality
Misic and Johnson (1999)	Functional/navigational: download speed, uniqueness, ease of navigation Content and style: counter, use of color and its consistency, graphics, style consistency, wording, currency
Moeller (1997)	Content, immediacy, interactivity, clear graphical design, ease of navigation
Nielsen (1999a)	Download speed, search mechanism, structure and navigation support, content, style,
Ozok and Salvendy (2001)	Text structure, general text features, information representation, lexical categories, meaning, user knowledge, text content, communicational attributes and physical attributes
Ranganathan and Ganapathy (2002)	Information content, design, security, privacy
Turban and Gehrke (2000)	Page loading speed, business content, navigation efficiency, security, and marketing and consumers' focus
Wan (2000)	Friendliness, responsiveness, reliability, informativeness

Table 1.3 Comparison of different information seeking models.

Author(s)	Information seeking model
Wilson (1999)	Proposed a general field of information behavior comprises 3 layers: ▪ Outer layer: information behavior ▪ Middle layer: information seeking behavior ▪ Inner most layer: information searching behavior
Marchionini and Shneiderman (1988)	Framework for information seeking consists of five components: setting, task domain, search system, user, and outcome.
Marchionini (1995)	Three-stage information seeking process comprises eight sub processes: ▪ Understanding problem stage: recognize and accept an information problem, and define and understand the problem ▪ Plan and execution stage: choosing a search system, formulate a query, and execute search ▪ Evaluation and use stage: examine result(s), extract information, and reflect/iterate/stop.
Kuhlthau (1991)	Six stages of information seeking process: initiation, selection, exploration, formulation, collection, and presentation.
Ellis (1989)	Six characteristics of information seeking behavior: chaining, browsing, differentiating, monitoring, and extracting.
Ellis and Haugan (1997)	Added two more characteristics of Ellis's (1989) characteristics with verifying and ending.
Xie (2000)	Two dimensions of information seeking strategy: ▪ Methods: scanning, searching, tracking, selecting, comparing, acquiring, consulting, and trial and error. ▪ Resources: information, meta-information, series of items, one-system/multiple databases, and human.
Belkin et al. (1993, 1995)	Four dimensions of information seeking strategy: ▪ Methods of interaction: scanning and searching ▪ Goal of interaction: learning and selecting ▪ Mode of retrieval: recognition and specification ▪ Resources: information and meta information

1.3. Research Questions

The Engle-Kollatt-Blackwell, or EKB, model of consumer behavior (Engel et al. 1986) depicts how information seeking plays an important role in the whole process of consumer's purchasing behavior. This model comprises five steps: problem recognition, internal search, external search, purchase process, and outcome.

According to this model, external search is often necessary when internal search cannot find enough information to support the decision that will lead to purchasing behavior. When “internal cues are weak, ambiguous, or uninterpretable, the individual is functionally in the same position as an outside observer, an observer who must necessarily rely upon those same external cues to infer individual’s inner states” (Bem 1978, p. 222).

Information seeking is one form of problem solving, motivated by goals; thus, it is an action oriented (Marchionini 1995). Individuals advance from initial state to a desired goal state, given certain conditions along the way. The planned model views information seeking behavior as “continuous and related actions, and which are all part of a goal-related plan” (Xie 2000, p. 843). According to this model, it is impossible to consider an action without an a priori plan (Ng 2000), if it is not a concrete plan, at least a partial or a general plan.

In contrast with the planned model, Suchman (1987) proposed an alternative theory called the situated action theory. This theory claims that to accomplish a certain task strictly according to a pre-determined plan is almost impossible. According to this theory, user actions were shaped by ad hoc and local contingencies of situation, not by a pre-designed plan. In this theory, she assumes that a plan is a representation of situated actions. Therefore, information seeking process is determined by both planned and situated aspects (Xie 2000).

Several scenarios occur when consumer visits an online store. Scenario one, consumer has decided what products to buy and he just made a purchase from that online store. Scenario two, he has decided what products to buy, but he wanted to compare the price of the same product from different stores. In this scenario, there is a probability that he never makes any purchase, because, for example, he cannot decide

from which store he wants to purchase. Scenario three, customer does not have any intention to purchase. He pays a visit to an online store just to see what products are available there, and move to different stores. Scenario four, the same as scenario three, except that after browsing the store for a while, he finds an interesting product that he quickly makes up his mind to purchase that product without further due. Scenario two, and scenario four demonstrates that, after browsing an online store for a while, customer's intention to purchase dies out, or kicks in, respectively. Scenario two demonstrates that consumer's intention changes negatively; while in scenario four, it changes positively. These scenarios demonstrate how information search plays an important role on consumer behavior. However, the above illustration does not mention about any strategy the customer might have been using. This situation creates a motivation to find an answer for the following research question:

How does Web search strategy affect online purchase intention?

The above research question is impossible to answer without taking into account several other aspects. As such, the above research question can be broken down into several research questions as described below.

Marchionini (1995) calls two strategies the seekers take to find information of interest as analytical strategy and browsing strategy. The main difference between these two strategies is that the former depends on careful planning, recall of query terms, iterative query reformulations, and examinations of results. In other words, it is more deterministic. The later is more heuristic and opportunistic and depends on how seekers recognize relevant information and relate information in hand with other information displayed on screen. Because of these different approaches, it can be argued that one strategy enables the seekers to see and perceive more information than the other. However, whatever the strategy the seekers have been using, the

information that the seekers obtain from the Internet may influence their future behavior, e.g. online purchase.

Zhang and von Dran (2000) and Zhang et al. (2000) categorized Web design factors into two groups: motivating factors (motivators) and hygiene factors. These factors are not all directly visible to the users. Users must rely on their perception and experience to identify and/or perceive that these factors are present at one Website but not at the other. Some Web design factors may motivate potential consumers to be more inclined to commit online purchase. This would happen when consumers perceive more benefits than the incurred costs of their online activity. On the other hand, several Web design factors often cause frustration that lead to the customer leaving the website. In this situation, consumers perceive less benefit than the incurred costs. We argue that the strategy the consumers take to find information of interest on their Web search activity could influence the perceived benefits and costs from their seeking activity. Therefore, the following research question is stated:

RQ1: *How different Web search strategies affect perceived Web search benefit and Web search cost?*

Customer is often confronted with a situation where he has to make a decision on what product to buy and/or where to buy certain products. A decision making process involves an active reasoning (Engel et al. 1986). Ajzen and Fishbein (1980) stated that people are essentially rational, who "make systematic use of information available to them" and are not "controlled by unconscious motives or overpowering desires", neither is their behavior "capricious or thoughtless". Rather, “people consider the implications of their actions before they decide to engage or not to engage in a given behavior” (p. 5).

Based on the above viewpoints, Engel et al. (1986) stated that the level of active reasoning might be different from one decision to another. Furthermore, Engel et al. (1986) stated that there are three significant factors influencing the degree of active reasoning, and one of them is involvement. Antil (1984) defines involvement as the level of perceived personal importance and/or interest evoked by a stimulus within a specific situation. In this case, the specific situation is demonstrated by the need of supporting information before purchase behavior is committed.

Barki and Hartwick (1989) also proposed the definition of user involvement. They defined user involvement as the user's psychological state in terms of the importance that the user attaches to a given system. It is the result of user interacting with a system (Griffith et al. 2001). Several design factors, e.g. navigation structures, contents, and screen lay out, may influence how users interact with a Website. In other words, the way a Website is designed, that will be perceived by its users as the benefits and the incurred costs, will affect the interaction outcome. As such, the following research question is stated:

RQ2: *How perceived Web search benefit and perceived Web search cost affect user involvement?*

According to Barki and Hartwick (1994), user involvement refers to a belief. In relation to the Website usage, it refers to the extent to which a user believes that a Website is both important and personally relevant, and interacting with a Website is also important and personally relevant. According to TRA and TPB, belief is one antecedent of attitude. In ECT, which is widely used in consumer behavior literature, user satisfaction is a function of user's confirmation about his expectation and perceived performance of products under consideration. On the other hand, user

involvement, as a result of interaction (Griffith et al. 2001), can also be argued as a confirmation of what the user expect to see from a Website and its performance. As such, the following research question is stated:

RQ3: *How does user involvement affect user satisfaction, user attitude, and online purchase intention?*

1.4 Thesis Structure

This chapter provides the definition of important terms relevant to this study. It presents the previous empirical studies on online purchase intention as well as information seeking. The presentation of the previous empirical studies allows the author to identify the gaps in the literature that justify the need to study and propose a new way of analyzing Web design factors. This study is conducted to have a deeper understanding on how Web design influences consumers' online purchase intention. This study is carried out to develop a model, operationalize the model, and empirically test the proposed model. The subsequent chapters are organized as follow:

Chapter 2: Presents the review of existing literature on information seeking model, intentional behavior, and Web design, as well as related literatures from sociology, and psychology. This is to identify the relevant theories and constructs to form a framework for this study.

Chapter 3: Presents a research model to show how perceived Web search benefit and perceived Web search cost associated with Web design factors relate to other constructs. This chapter also presents the formulation of the hypotheses.

Chapter 4: Presents the methodology used in this study. It includes the operationalization of independent and dependent variables for the research model. It also describes how the pilot study and the real experiment were conducted. Descriptive statistics are presented in this chapter.

Chapter 5: Presents the result of the data analysis gathered from the experiment for the proposed model.

Chapter 6: Presents the interpretation of the results, and theoretical as well as practical implications of the proposed model.

Chapter 7: Presents a conclusion as well as the limitation of this study and the directions for future research.

Chapter 2

LITERATURE REVIEW

This chapter presents a selection of literature review relevant to this study. The purpose of this literature review is four-fold. Firstly, it introduces theoretical basis for explaining individuals' information seeking behavior. Secondly, together with the previous studies, it identifies variables that relate individuals' information seeking behavior to purchase intention. Thirdly, it serves as a basis for explaining the observed phenomenon in the proposed model and hypothesis testing. Finally, it helps position this study with respect to previous and ongoing research in the related fields.

This study emphasizes online purchase intention and Web search strategy. Purchasing product online requires customers to deal with a Website where products of interest are displayed along with the accompanying information. The decision whether a purchase would be committed is often preceded with information search related to the products of interest. During their interaction with a Website, users may enter into a psychological state called involvement (Griffith et al. 2001). This psychological state may influence purchasing behavior (e.g. Zaichkowsky 1985, Amoako-Gyampah and White 1993).

To follow the above rationale, the literature review consists of seven sections. Section one discusses intentional behavior theory based on TRA and ECT to introduce the antecedents of intention, namely attitude and satisfaction. It is followed by the discussion of online purchase intention and the affecting factors. Based on the fact that online purchase is influenced by the technology used to display the products (e.g. Rose et al. 1999), section two discusses Website as a marketplace technology. The review begins with the discussion about a Website being a communication

medium, followed by a review of online store design. This online store design is meant to compare the components of offline retail store design with its counterpart, i.e. online store. As designing an online store design is exactly the same is designing a Website, then the review of general Website design followed.

Information about products under consideration affects the decision to purchase these products. Thus, information seeking is often conducted before consumers arrive at the decision whether or not a purchase behavior will be committed. With this rationale, section three discusses information seeking that includes information seeking models and strategies, the effect of search task on information seeking strategy, and the effect of Web design on information search cost. This section also discusses the cost/benefit of information search activity based on the interpersonal communication by Gatignon and Robertson (1986)

Consumers' assessment of the technology would have an impact on purchase intention (Gefen et al. 2003, van der Heijden et al. 2003). Based on this rationale, section four discusses a cost-benefit analysis related to Web design elements on the information seekers' side. It starts by arguing that certain Web design elements would provide benefits to users and different sets of Web design elements would be the incurred cost of Web surfing activities. Then, several supporting theories and empirical studies will be presented to support the above arguments.

As explained, section one discusses online purchase intention and its affecting factors while section two to section four discusses the physical environment where users interact with a Website. These two sides are connected to each other with user involvement that is considered as the result of user interacting with a Website. As such, section five discusses user involvement from several perspectives, i.e. information systems, consumer behavior, psychology, and human computer

interaction. It also discusses how user involvement differs from user attitude, and how user involvement construct was measured in the previous studies.

Many studies have indicated that experienced users are able to find certain information faster than novices. These studies indicated that this phenomenon was due to the better mental model that the experienced users posses. As such, section six discusses the mental model theory as a basis of explaining how user experience may moderate information seeking behavior. Summary of the above sections is presented in section seven.

2.1 Intentional Behavior

On the relationship between behavior and intention to commit the behavior, Ajzen and Madden (1997, p. 248) stated that:

> "According to the theory, the immediate antecedent of any behavior is the intention to perform the behavior in question. The stronger a person's intention, the more the person is expected to try, and hence the greater likelihood that the behavior will actually be performed."

The Theory of Reasoned Action, or TRA, (Fishbein and Ajzen 1975, Ajzen and Fishbein 1980) specifies two conceptual independent determinants of intention. The first one is personal in nature, and the second one reflects the social influence. The personal factor is the individual's positive or negative evaluation of performing the behavior; this factor is termed as attitude toward the behavior. It simply refers to the person's judgment that performing the behavior is good or bad then he is in favor or against performing the behavior. The second determinant of intention is the person's perception of the social pressures put on him to perform or not to perform the behavior in question. This factor is termed as subjective norm. Individuals will intend to perform a behavior when they evaluate it positively and when they believe

that important others think they should perform it. The strong relation between attitude and intention is showed by the fact that

> "Intentions have frequently been subsumed under the concept of attitude and that no distinction between attitude and intention has usually been made. The usual assumption is that the more favorable a person's attitude toward some object, the more he will intend to perform positive behavior (and the less he will intent to perform negative behaviors) which respect to that object" (Fishbein and Ajzen 1975, p. 288).

TRA suffers from incomplete volitional control, which is when people can easily perform particular behavior if they are so inclined, or refrain from performing it if they decide against it (Ajzen 1988). In an attempt to go beyond non-volitional action, the Theory of Planned Behavior (TPB) was introduced. TPB is an extension of TRA to include the concept of behavioral control to deal with the internal and external factors that may interfere with the control over the intended behavior (Ajzen 1991, Ajzen and Madden 1997). This antecedent is called perceived behavioral control. Perceived behavioral control refers to

> "… people's perception of the ease and difficulty of performing behavior of interest. … Thus, a person may believe that, in general, her outcomes are determined by her own behavior (internal locus of control), yet at the same time she may also believe that her chances of becoming a commercial airplane pilot are very slim (low perceived behavioral control)" (Ajzen 1991, p. 183).

2.1.1 Satisfaction as an Antecedent of Intention

The Expectation-Confirmation Theory, or ECT (Oliver 1980), which is widely used in marketing and consumer behavior literature (e.g. Bhattacherjee 2001b, Dabholkar et al. 2000, Anderson and Sullivan 1993, Oliver and Linda 1981, Spreng et al. 1996, Swan and Trawick 1981), posits that user satisfaction is an important antecedent of intention. Oliver (1980) and Bhattacherjee (2001b) describe the underlying logic of the ECT framework as follows. First, consumers form an initial

expectation of a specific product or service prior to purchase. Second, after a period of initial consumption, they form perceptions about its performance. Third, they assess its perceived performance vis-à-vis their original expectation and determine the extent to which their expectation is confirmed. Fourth, they form a satisfaction level based on their confirmation level and the expectation on which that confirmation was based. Finally, the satisfied consumer forms a repurchase intention.

2.1.2 Online Purchase Intention and the Affecting Factors

Van der Heijden et al. (2001) defined online purchase intention as the degree to which a customer is inclined to purchase a product or service at a particular website. According to TRA, customers' intention to purchase is preceded by their attitude toward the purchase. Internet shopping behavior shares the volitional nature of the phenomena that TPB tries to explain and predict (Jarvenpaa et al. 2000). On the technology side, the Technology Acceptance Model, TAM (Davis 1989, Davis et al. 1989) is a popular model to predict intention based on the perceived ease of use and perceived usefulness of certain technology. With this model, acceptance of the Internet as a buying tool can be predicted (e.g. Venkatesh and Davis 2000).

Several factors have been identified to influence online shopping intention: customer satisfaction with online store design (e.g. Lee and Lee, 2003), secure payment (Ratnasingham 1998, Salisbury et al. 2001), product quality (Huddleston et al. 2001), company trustworthiness (Jarvenpaa et al. 1999, Turban et al. 2000, van der Heijden et al. 2003), after sales support or technical support (Easingwood and Storey 1991), perceived store size (Lohse and Spiller 1998, Jarvenpaa and Tood 1997, Jarvenpaa et al. 2000), and the technology used to implement online stores (van der Heijden et al. 2003, Gefen et al. 2003).

The essence of a Website is an information technology (Gefen et al. 2003). They argued that TAM could explain online purchase intention. According to TAM, intention is influenced by perceived ease of use and perceived usefulness. Perceived ease of use significantly affects attitude toward online purchase (van der Heijden et al. 2003), trust (Gefen et al. 2003), and willingness to adopt certain technology, e.g. wireless Internet via mobile devices (Lu et al. 2003). Lee (2002) showed that certain technology, e.g. payment systems, security technology and online customer service center, significantly influences customers' intention to purchase online. Several other Website design elements related to technology have also been identified as factors affecting online purchase intention (Song and Zahedi 2001).

Alba et al. (1997) stated that interactive shopping technologies provide customers with a huge volume of information, searching and screening mechanism, and product selections. The quality of purchase decisions can be improved by lowering search costs (Ratchford 1982, Hauser and Wernerfelt 1990). The technologies are the most satisfactory in the cases where they are easy to use, reliable, save time, offer greater control, and address salient needs (Meuter et al. 2000). Zeithaml (2000) stated that the convenience of online shopping, the ease of product and price comparison, lower prices, and the ability to buy unusual items are the primary reasons why individuals shop online.

On the negative side, Quelch and Takuechi (1981) warned about the poor quality of digital information, especially if consumers typically rely on the social or physical interaction to evaluate product quality. New technologies may be confusing, take time to learn, are prone to failure, and can raise the prices of goods and services, thus, discouraging usage (Mick and Fournier 1998, Venkatesh 2000, Meuter et al. 2000).

2.2 Website as a Marketplace Technology

Bagozzi (1974) stated that in order to apply an exchange theory into marketing, two broad requirements must be satisfied. These two requirements comprise the structure of exchange and the media of exchange. This section is devoted to explain a Website as a medium of exchange. It discusses how the Internet shares many similarities with marketplace mechanism, followed by a discussion on online store design as to mimic the offline store design, and followed by a discussion on Website design. The discussion of the exchange structure (e.g. Bagozzi 1975) is beyond the scope of this review.

2.2.1 Website as a Medium of Exchange

The Web should be viewed as a 'multi-activity medium' rather than a single-dimensional activity (Chen et al. 1999). The activities in the Web environment can no longer be defined as merely navigating, surfing, or searching. There are many possibilities on the Web that involve new creative, communicative and collaborative activities. These activities are enabled because of technology advancement. The Web provides "an efficient channel for advertising, and marketing, and even direct distribution of certain goods and services" (Hoffman and Novak 1996, p. 52). It moves as much information that can pass through the geographical boundaries on a real-time basis without much constraint (Biswas and Biswas 2004).

In an attempt to show that the Internet shares many similarities with marketplace mechanism, Forbes and Rothschild (2000) use seven comparison criteria. The seven comparison criteria are:

- Communication models utilized by the Internet. Depending on the users' purpose, communication model utilized by the Internet may be in the form

of one-to-one, one-to-many, and even many-to-many model. The first two models can easily be found on emailing activities, while many-to-many model can be found in online chatting. Several advantages can be obtained by using many-to-many model (Hoffman and Novak 1997), such as: consumers can interact with the medium and with each other, firms can provide content to the medium and interact with each other, firms and consumers can interact, and consumers can provide commercially oriented content to the medium.

- Source knowledge of audience, i.e., the level of information about the receiver that the sender has. To some extent, it is very important for the sender to have personalized information about the receiver. This enables the sender to target individual receiver whenever necessary.
- Segmentation or demassification of a medium. Rogers (1986, p. 5) defines demassification as the extent to which a special message can be exchanged within individuals. Demassification can also be thought of as personalization of a message.
- Feedback, which refers to the capability of the various mediums to accept feedback from the receiver of the message.
- Control of communication flow, which is used to measure the extent that the sender or receiver influences the course of communication. In some traditional medium like television and radio, the sender mostly dominates the communication flow. In the Internet, receivers have a significant control over the communication flow. This communication flow can be controlled through the navigation means, such as clicking on the available links or menus.

- Fluidity, which measures the ability of a medium to facilitate easy movement within its own context. It is very important to enable Web users so that they can easily move from one subject to another in one site, as well as from one site to another, on their own will.
- Scope or range of information available within a medium. The scope can be operationalized in two ways: breadth and depth. Breadth is the range of subject matter easily accessible within the medium. Depth is the quantity of the information about a particular subject.

One characteristic that the market is competitive is the availability of perfect information (Wigand 1997). Perfect information denotes that customers will have all the information they need to make rational decisions about which goods or services to purchase in the marketplace.

2.2.2 Online Store Design

Consumer acceptance may be based on the system's features such as design, information quality, security, functionality, services, and other features, supported by the Web system, such as responsiveness, reliability, and empathy (Palmer 2002, Ranganathan and Ganapathy 2002, Pitt et al. 1995). Zhang and von Dran (2001-2002) explored the quality measures using factor analysis and showed that information content, service, and design are the key success factors for e-commerce. Pitt et al. (1995) introduced the augmented model which includes system, information, and service quality as independent variables for IS success.

Online retail stores "offer direct sales through an electronic channel via an electronic catalog or other more innovative format" (Hoffman et al. 1996). As for

traditional retail stores, several factors are important for the success of online retail stores, including store layout and store design. A well-designed Website could affect traffic and sales (Lohse and Spiller 1999). Spiller and Lohse (1998) compared several factors pertaining to the traditional retail stores with those of online retail stores, as presented in Table 2.1.

Table 2.1 Comparison between retail stores and online stores
(Source: Spiller and Lohse 1998)

Retail store	Online store
▪ Sales clerk service	▪ Product descriptions, search functions, gift services
▪ Store promotions	▪ On-line games and lotteries
▪ Store window displays	▪ Home page
▪ Store atmosphere	▪ Interface and graphics quality, product arrangement
▪ Aisle products	▪ Featured products on each hierarchical level of the catalog
▪ Store layout	▪ Screen depth, browse and search functions, image map, indices
▪ Number of floors	▪ Hierarchical levels of the catalog
▪ Number of outlets	▪ Number of web links to a catalog
▪ Checkout cashier	▪ Shopping basket or order form
▪ See and touch of the merchandise	▪ Limited to image quality and description, future potential for sound and video

According to Lohse and Spiller (1998), perceived store size and range of products play an important role to influence customer's intention to buy. Perception of store size is a prerequisite for consumers to develop their trust (Jarvenpaa and Todd

1997). The size of an advertisement banner is often used as an indication of how big a company is (Hoque and Lohse 1999).

Based on the Stimulus-Organism-Response framework (Mehrabian and Russell 1974), Eroglu et al. (2001) proposed a framework to test how customers response, in term of avoidance/approach, to store atmospheric cues. This model positions pleasure, arousal, and attitude as mediating variables between site atmosphere (stimulus) and satisfaction, as well as approach/avoidance response. Based on their framework, they found that the site atmosphere has indirect effect on attitude, satisfaction, and approach/avoidance behavior as a result of the emotions experienced (pleasure and arousal) by the shoppers. Shoppers felt increasing level of pleasure with increasing quality of online store atmosphere. This effect is moderated by involvement.

In a traditional shop, the impact of atmospheric cues toward customer behavior has been studied, e.g. lighting, music, color, and scent (Golden and Zimmerman 1986, Hui et al. 1997, Belizzi et al. 1983, Spangenberg et al. 1996). Similar to traditional in-store stimuli, online cues like colors, graphics, layout, design, and music, may well influence shoppers' responses.

In addition to several dimensions that are also important in offline shopping (assurance, access, reliability, responsiveness, and customization/personalization), Zeithaml et al. (2000) discovered that ease of navigation, site aesthetics, flexibility, efficiency, and price knowledge were critical in the online environment.

Besides the above factors, Burke (2002) stressed the need to have a Web designed so as to facilitate "fun of shopping." This is consistent with Wolfinbarger and Gilly (2001), who reported that "experiential shoppers" want to have fun while shopping online. Richmond (1996) found that entertaining factors, e.g. by providing

customers with animation on a Website, increase time spent at the Website, which in turn significantly impacts on dollar spent per person.

Ease of use has been identified as an important antecedent of technology usage (Davis 1989, Davis et al. 1989). Helander and Khalid (2000) have also mentioned that ease of use is one important factor of e-commerce success. Simplicity, support, visibility, reversible actions, feedback, accessibility, and personalization are among general principles of designing a Website (Helander et al. 1997). Fuccella and Pizzolata (1997) stated that designers need to combine many design elements, like good layout, effective graphics, exciting content, and intuitive navigation, to have a well designed Website. It is important to have a well-designed Website because customers are more likely to shop at well-designed websites (Liang and Lai 2002).

2.2.3 Website Design

Due to the dynamic nature of a Website, designing a Website is not an easy task. It must consider several aspects including how information is structured and presented, as well as a better understanding about the target audiences. Designing information for a Web is similar to designing for paper (Moeller 1997). The difference is that the interactivity that the Web affords. Interactivity is very important to make a Website enjoyable to visit (Chakraborty et al. 2003).

Many studies have been conducted to assess the factors influencing Website design and its quality. These studies emphasize different aspects of Web design and quality (e.g. Liu and Arnett 2000, Huizhing 2000, Misic and Johnson 1999, Moeller 1997, Turban and Gehrke 2000, and Nielsen 1999a). As a result, instead of providing designers with a guiding light on how to design a Website that will please the majority of users, the fact that there is no consensus among researchers on a “Website

standard" may spell trouble for designers. This situation can be observed from several impediments of Website success as stated by Rose et al. (1999).

Web design elements can be grouped into content component and design component (Huizhing 2000). The content component addresses the issue of what is included in the site and identifies various types of information. Web content has been identified as one of the main factors contributing to repeat visits (e.g. Rosen and Purinton 2004). As Web content may include text, pictures, still graphics, animations, layout, and sound, making the right web content decisions are critical to effective Web design. The design component should address presentation and navigational features. The main concern is to help users build a mental map about the Website. A user with a better mental model performs better on certain tasks (Olfman and Shayo 1997, Dillon 1991).

2.3 Information Seeking

Marchionini (1995) defines information seeking as "a process in which human purposefully engage in order to change their state of knowledge" (p. 5). It is a kind of problem solving, motivated by goals; thus, it is action oriented. From users' perspective, Kuhlthau (1991) states that information seeking process is a form of constructive activity which leads to finding the meaning of information in order to extend their state of knowledge on a particular problem or topic. It is a process of sense making, which involves the whole user's experience, feelings, thoughts, and actions. In line with Kuhlthau (1991), Kim and Hirtle (1995) stated that when seeking for information in a hypertext system, users must carry out multiple tasks concurrently. These tasks are: 1) navigational task, i.e. to plan and execute routes through a hypertext network; 2) informational task, i.e. to read and understand the

hypertext nodes contents and their relationships; and 3) management task, i.e. to coordinate the above two tasks.

Navigation is an incremental real-time process that integrates physical activity (called locomotion) and decision-making (Jul and Furnas 1997). It is not merely physical translation through a space, but it also involves cognitive activity. This cognitive element is often referred to as wayfinding. It involves mental representation, route planning, and distance estimation (Darken et al. 1999).

Informational task, as evident from Kuhlthau's (1991) model (see Table 2.2), mostly deals with cognitive activities. It includes memorizing information, paying attention to what is shown on the screen, deciding what information should be retained, and whether they need to continue searching. Chen et al. (1997) captured this phenomenon in their conceptual model of user's information processing on the Web as shown in Figure 2.1. In this conceptual model, user's information processing is said to be influenced by factors related to the system as well as to the cognitive aspects.

2.3.1 Information Seeking Models

The multiple tasks that must be carried out by users suggest that information seeking process involves several stages or subprocesses. Marchionini (1995) proposes an information-seeking model comprises eight subprocesses, which can be grouped into three stages. The first stage is called "define and understanding problems" (DUP). It comprises two subprocesses: recognize and accept an information problem. The second stage is called "plan and execution" (PE). It comprises three subprocesses: choose a search system, formulate a query, and execute search. The last

stage is “evaluation and use” (EU) comprises three subprocesses: examine result, extract information, and reflect/iterate/stop.

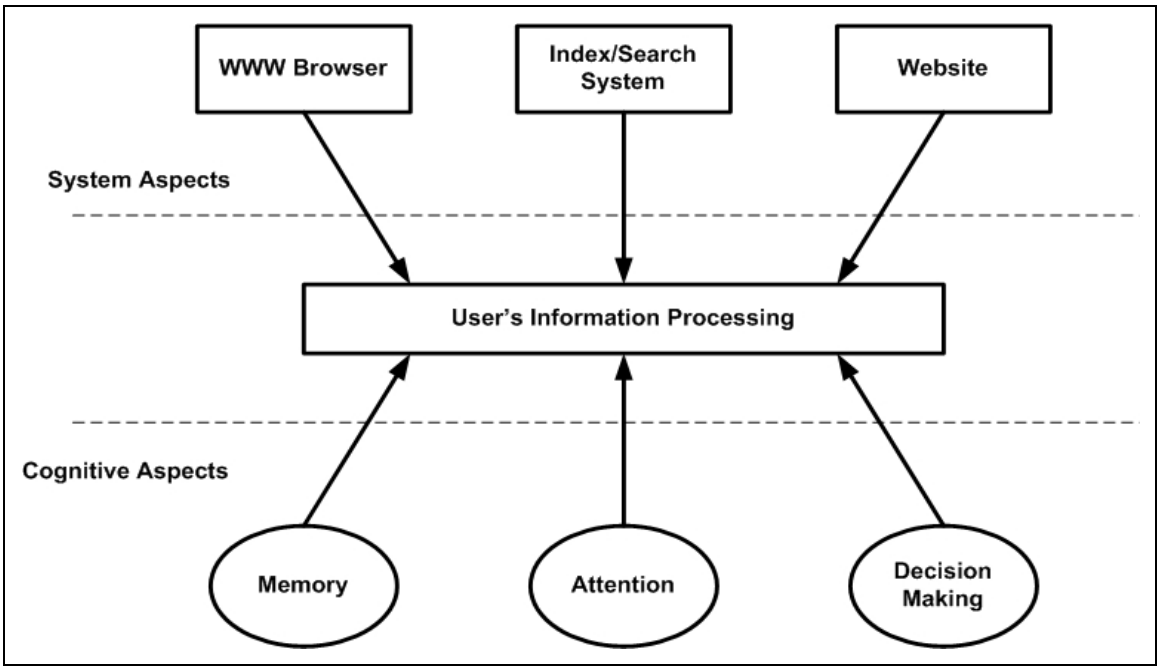

Figure 2.1 The conceptual model of user’s information processing on the Web, emphasizing the factors involved (Chen et al. 1997).

In an attempt to systematically derive recommendations for information retrieval systems, Ellis (1989) interviewed various groups of academics and researchers staffs in social science departments. The analysis of information seeking behavior of each subject indicates that there are six different characteristics of information seeking behavior. The six characteristics are: starting, chaining, browsing, differentiating, monitoring, and extracting. These characteristics provide a framework for a flexible behavioral model for information retrieval system design and evaluation. Ellis and Haugan (1997) confirmed the above model with two additional characteristics: verifying and ending.

Kuhlthau (1991) proposes a model of information seeking process (ISP) that incorporates three realms: affective (feelings), cognitive (thoughts) and physical

(action). Her model is based on the uncertainty of the domain space and the users' anxiety, particularly in the early stage. This model comprises six stages: initiation, selection, exploration, formulation, collection, and presentation. Table 2.2 shows these six stages versus the three realms including the appropriate task for each stage.

Table 2.2. Kuhlthau's model of information seeking process (Source: Kuhlthau 1991).

Stage in ISP	Feelings common to each stage	Thoughts common to each stage	Actions common to each stage	Appropriate task
Initiation	Uncertainty	General/vague	Seeking background information	Recognize
Selection	Optimism			Identify
Exploration	Confusion/Frustration/ Doubt		Seeking relevant information	Investigate
Formulation	Clarity	Narrowed/ clearer		Formulate
Collection	Sense of direction/ confidence	Increased interest	Seeking relevant or focused information	Gather
Presentation	Relief/satisfaction or disappointment	Clearer or focused		Complete

2.3.2 Information Seeking Strategy

Strategy is the approach that an information seeker takes to a problem (Marchionini 1995). Marchionini (1995) divides strategy into analytical strategy and browsing strategy. Analytical strategy is formal and batch-oriented, while browsing strategy is informal, opportunistic and interactive. Table 2.3 presents a complete comparison between these two strategies.

Cove and Walsh (1988) described browsing as a process of picking out bits and pieces, selecting worthwhile and useful information where the initial search criteria are only partly defined. They categorized Web browsing into: search browsing, general purpose browsing, and serendipity browsing. While Cove and Walsh (1988) categorize browsing into three different categories, Jul and Furnas

(1997) only distinguish searching from browsing. Jul and Furnas (1997) describe searching as information seeking task to look for a known object, while browsing is to see what is available.

Table 2.3 Comparison of analytical strategies and browsing strategies (Source: Marchionini 1995).

Analytical Strategy	Browsing Strategy
▪ Depends on careful planning, recall of query terms, iterative query reformulations and examinations of results. In other word, more deterministic.	▪ Heuristic, opportunistic, and depends on recognizing relevant information.
▪ Batch oriented and half duplex (turn taking).	▪ More interactive and real-time exchange between information seeker and information system.
▪ Demands bigger cognitive overload in advance and a less steady attentional load throughout the information seeking process.	▪ Demands smaller cognitive overload in advance and a steadier attentional load throughout the information seeking process.
▪ Can be conducted by the search intermediaries for the sake of the user of the information.	▪ Can be conducted by the user of the information.

Swanson (1987, 1989) offers another search strategy called trial-and-error. Trial and error is a method of solving problems in which many solutions are tried until errors are reduced or minimized (http://www.iteawww.org/TAA/Glossary.htm). This strategy consists of two parts: exploratory process and elimination process. The exploratory process mainly is to explore what is available, and the elimination process is the process of deleting irrelevant information. It is why this strategy is also called an explore/exclude strategy.

2.3.3 The Effect of Search Tasks on Search Strategies

Several studies reported how search tasks influence search strategy. Chen et al. (1997) use navigation path length to investigate whether search tasks influence search strategies. They found that shorter paths were common when searching for specific information. Navarro-Prieto et al. (1999) suggested that certain strategy might be predominant for certain task. In their study, subjects predominantly use top-down strategy for both specific fact finding and exploratory tasks on a categorical structure. For both fact-finding and exploratory tasks on a dispersed structure, subjects predominantly use bottom-up strategy. Different search strategies due to different search tasks have also been reported by Hsieh-Yee (1998). For example, when many items were to be retrieved, browsing was the most popular strategy. For known items, whether it was text or image, no different tactics were reported.

2.3.4 Cost and Benefit of Information Search

Information search activity relies on the availability of the source of information provided by the information providers. On their interpersonal communication framework, Gatignon and Robertson (1986) stated that both the information providers and the information seekers are subjected to cost/benefit analysis. This framework does not include the cost/benefit analysis related to the communication medium.

For information seekers, Gatignon and Robertson (1986) stated that information value and relief from decision anxiety are the benefits the seekers can get from receiving information. As stated earlier, information search is the seeker's constructive activity of finding meaning from information in order to extend his state of knowledge on a particular problem or topic. It is a process of sense making, which

involves the whole seekers' experience, feelings as well as thoughts and actions (Kuhlthau 1991). When seekers have to make decision about a particular problem, they may need to collect information about problems before making decisions. Whether or not the collected information relevant to the decision making process depends on how seekers value the collected information. As such, receiving valuable information will give benefit to the seekers.

Kuhlthau (1991) stated that at the end of an information-seeking episode, seekers might feel relief and satisfaction because they have succeeded in getting enough information to solve a particular problem. With enough relevant information in hand, seekers may gain more confidence in their decision-making process.

The incurred costs during an information-seeking episode include risk of accepting poor information and the assumption of subordinate position. In the Internet, data was neither designed for integration nor to be presented as coherent information (Albers 2002). Extracting and combining relevant information is pushed to the Internet users. Besides, information provided on the Internet is not always trustworthy and often outdated. Seekers need to exercise their discretion in digesting any information they get from the Internet. In other words, seekers must understand the risk of accepting inaccurate and outdated information.

Being always dependent on others may put seekers in a subordinate position. Although some seekers may have higher tolerance for taking this position, this situation may lead to a relationship breakdown, because no reciprocity occurs (Gatignon and Robertson 1986).

2.3.5 The Effects of Web Design on Information Search Cost

In general, the way information is presented online has significant impact on information search cost (Hoque and Lohse 1999). Information seeking is costly because it is path dependent (Soder 2001). Hoque and Lohse (1999) compared how information search cost in electronic yellow pages differs from one in paper yellow pages. They showed that keyword search in electronic form is more effective than on paper. The situation was in the opposite direction when users search information through alphabetic listings. With alphabetic listings users need additional effort attributed to download time and motor movement (e.g. mouse clicking). Download time has been identified as a major source of user frustration (Pitkow and Kehoe 1996).

One common design element in a commercial Website is advertisement. Advertisement size is often used to indicate product or service quality (Kirmani 1990), company reputation and credibility (Moriarty 1986), and how big and prosperous the company is (Hoque and Lohse 1999). In a Website, advertisements are shown as images with various sizes and resolutions. A study by Lee and Benbasat (2003) shows that higher visual fidelity images lead to greater user attention to the product examined. The study also shows that image size is an important variable that influences customers' buying behavior. Bigger images are viewed first (Lohse 1997). However, bigger images need longer time to download. As such, bigger images on a Website tend to slow down system response. Also, too many advertisements in a Website may distract seeker's concentration (Zhang 2000).

Link colors and menu positions may influence information seeking performance (Pearson and van Schaik 2003). In their experiment, Pearson and van Schaik used blue and red link colors, and left, right, top and bottom screen positions

for the menus. The effects of link color and menu position on users performance, in term of time, have been reported. However, no evidence was found for an overall effect of menu position on error rate.

Information search cost influences consumers' behavior (Widing and Talarzyk 1993). Consumer will be price sensitive if merchants reduce the information search cost for information about product prices (Alba et al. 1997). Putrevu and Ratchford (1997) found that the search for groceries was negatively related to search cost (i.e. time) and positively related to enjoyment, which lowers search cost. Limited search is due to perceptions of low benefits and/or high costs.

2.4 Cost-Benefit Analysis Related to Web Design

The Gatignon and Robertson's (1986) framework of interpersonal communication did not mention about the medium of communication. Since the communication in the Internet is mediated by a Website, a cost/benefit analysis related to a Website need to be assessed. This section discusses how cost/benefit analysis associated with the Website is assessed. The rationale is that when users visit a Website, they may or may not get the information they intend to find, but surely they will incur cost related to Website design element. The same cost/benefit analysis associated with a Website should also be applied to providers. However, such a discussion is beyond the scope of this study.

As mentioned, the two-factor model of Web design and evaluation (Zhang and von Dran 2000, Zhang et al. 2000) comprises two groups of factors called motivators and hygiene factors. The word "motivators" and "hygiene factors" were adopted from Herzberg (1966), in which motivators are those factors that lead to job satisfaction, and hygiene factors are those that may lead to job dissatisfaction. In the context of

Web design, motivators are those Web design elements that lead to user satisfaction, and hygiene factors are those design elements that lead to user dissatisfaction. Thus, motivators are also called satisfiers and hygiene factors are also called dissatisfiers, (Zhang and von Dran 2000, Zhang et al. 2000). They differentiated satisfaction from dissatisfaction because when a user is not satisfied with a particular Web design, it does not mean he is dissatisfied with it. On the other hand, when a user is not dissatisfied with a particular Web design, it does not necessarily mean he is satisfied with it.

2.4.1 Perceived Web Search Benefit

Benefit can be defined in many ways, e.g. related to activity, product, or service. In relation with activity, benefit is defined as "inclusive terms used to quantify the positive expected results or outputs of a proposed activity" (http://fwie.fw.vt.edu/rhgiles/ appendices/glossb.htm). In relation with product or service, benefit is defined as "the advantage that a feature of a product or service provides to the customer" (http://www.flexiblelearning.net.au/toolbox/demosites/ series3/317/resources/glossary/gls_idx.htm.) The advantages can be in term of attributes, subjective characteristics, or emotions (http://www.oup.com/uk/booksites/ content/0199274894/student/glossary/glossary.htm). Benefits are perceived, not necessarily real (http://www.shape tomorrow.com/resources/glossaryofterms.html).

A Website can be viewed as a product and/or a service. It is owned by individuals or companies to offer their products and/or services to their customers. The products and/or services are shown using Web design elements, e.g. images, information contents, as well as links and other navigation means. As such, the benefits that a Website offers to its users can be perceived from its design elements.

In the two-factor model, the term “motivators” is used to group Web design elements that have strong supportive motivational features, i.e. enjoyment, cognitive outcome, credibility, and visual appearance. According to this model, these features could bring users to state of satisfaction. Thus, it is argued that these design elements are the benefits the users perceive during their Web visit.

Enjoyment. In Zhang and von Dran (2000), enjoyment is described as design factors that make the Website enjoyable and entertaining to use. Enjoyment is an “act of receiving pleasure from something” (http://www.cogsci.princeton.edu/cgi-bin/webwn). It is an intrinsic motivator when it comes to the domain of IT (Davis et al. 1992). Csikszentmihalyi (1990), with his flow construct, has captured an individual’s subjective enjoyment of the interaction with the technology that can significantly predict attitude and extent of technology use (Trevino and Webster 1992). Empirical results have shown that enjoyment “explained additional variance in usage intentions” (Agarwal and Karahana 2000, p. 673). When users enjoy their visit to a Website or felt entertained by what they see on, or hear from, that Website, they get the benefits as an exchange for their time visiting that Website. This phenomenon has also been reported by Beatty and Smith (1987).

Cognitive outcome, in the two-factor model, is related to learning while using a Website (Zhang and von Dran 2000). Learning (or training) is related to the formation of a mental model (Borgman 1999) of a particular system, e.g. Website. With better mental models, users may perform better on certain tasks (Olfman and Shayo 1997, Dillon 1991). With this evidence, it is argued that cognitive outcome is a benefit for those who engage in an exchange transaction through the use of Website.

Credibility is related to identity, recognition (Zhang and von Dran 2000) and reputation (Lafferty and Goldsmith 1999). Credibility “involves the degree to which

consumers trust the information provided by an online retailer … is one important element of online retail service quality" (Janda et al. 2002, p. 418). Company credibility is "the extent to which consumers feel that the firm has the knowledge or ability to fulfill its claims and whether the firm can be trusted to tell the truth or not" (Newell and Goldsmith 2001, p. 235). Research conducted by Lafferty and Goldsmith (1999) shows that corporate credibility influences purchase intention significantly. If the companies are assumed to be the source of credible information, highly credible companies effectively gain more attention (Sternthal et al. 1978) and customer readership (Williams 1988) than less credible companies. This to imply that accepting credible information would be a benefit to seekers.

Visual appearance relates to the look of a website (Zhang and von Dran 2000). This includes color combination, typeface, font size, screen layout, and the appropriate use of graphics. Consistent visual appearance affects the development of a mental model that facilitates learning, and affects user performance (Satzinger and Olfman 1998).

2.4.2 Perceived Web Search Cost

Users who visit a new website may experience difficulties in navigating that website. They may encounter slow downloading, need to reveal personal particulars in order to be able to download materials, need to spare their time to do the surfing, etc. All these difficulties and hassles can be considered as the cost that seekers have to pay while accessing a website. As a result, seekers may turn their back from that Website because they think that their visit is not worthwhile, i.e. the incurred costs are greater than the benefits.

Cost is defined as something valuable that has been given up in exchange for goods or services (http://www.ots.treas.gov/glossary/gloss-c.html). In this definition, "something valuable" can be in the form of monetary means, time, or other valuables. As with "motivators", the term "hygiene factors" is used to group Web design elements that make the Website function properly and usable. In the two-factor model, three categories were clearly identified hygiene factors, i.e. technical aspects, navigation, and privacy and security. It is argued that these categories are the cost that must be bourn by users when they visit a Website. The arguments are as follow

Technical aspects relate to the basic functions of a website (Zhang and von Dran, 2000). Often, when users surf a particular Website, they see "Under construction" messages, come across broken links, wrong links, pages that link to themselves, etc. Users may leave the website, and probably may not want to revisit that website. Users may perceive this situation as wasting their time, without getting any gain or benefit. It is a cost.

Another cost related to the technical aspects is download delay (Rose et al. 1999). A slow download speed may cause frustration. It is the most serious problem users have experienced (Pitkow and Kohoe 1996). Several studies have identified download speed as one of important design criteria for the Web success (e.g. Nielsen 1999b, Turban and Gehrke 2000). Rose et al. (1999) have also identified a lack of Internet standards as one technological impediments of e-commerce success. For example, there are several browsers available on the market. However, they do not have the same capabilities and features when it comes to certain plug-ins, e.g. a browser may not be able to run Java applets, or not able to show certain type of characters. Also, different operating systems often cause incompatibility problems.

Navigation. The foundation of Websites is based on hypertext that is "a database composed of a collection of nodes of data items and where relations between nodes are represented by explicit links" (Kim and Hirtle, 1995, p. 239). The non-linear structure of hypertext enables individuals to jump from one part to another quite easily. However, users may not have a clear conception of the relationships within the system, not knowing where to go next, or knowing where to go but not knowing how to get there, and not knowing where they are in the overall structure of the document (Elm and Wood, 1985). This problem is known as disorientation (e.g. Ransom et al. 1997). Foss (1989) elaborated this problem by stating that

> "… Being disoriented is more than not knowing the spatial layout of the frames in the hypertext network. Other problems that 'lost' or 'disoriented' users have are: arriving at a particular point in a document and then forgetting what was to be done there; neglecting to either return from digressions or to pursue digressions that were planned earlier; not knowing if there are any other relevant frames in the document; forgetting which sections have been examined or changed after hours of browsing" (p. 407).

When users navigate a Website and becomes disoriented, they may have lost what they already collected. In this case, they suffer from the lost of their time and perhaps the precious information they previously discovered but had forgotten.

Privacy and Security. Privacy is "the protection of sensitive and personal information from unintentional and intentional attacks and disclosure" (http:// www.maithean.com/products/glossary.html). It is "one of the most important ethical issues of the information age" (Smith et al. 1996, p. 167) When conducting an online transaction, customers are asked to reveal their personal information that will be kept in the company's database. This is the trade-off the consumers get from conveniently doing online transaction.

Many studies have been conducted to investigate the effect of privacy toward online behavior. Koyuncu and Lien (2003) showed that privacy has negative impacts on online orders. Privacy concerns also influence customer's trust (Luo 2002), perceived risk (Miyazaki and Fernandez 2000), and purchase intention (Miyazaki and Fernandez 2000, Suh and Han 2003).

Security is "freedom from anxiety of fear" (http://www.cogsci.princeton.edu/cgi-bin/webwn). On the Internet, information is transmitted through communication channel, which is susceptible to be abused, misused, and gets failure in many ways. Individual, as well as business, may suffer tremendously from these weaknesses (Ratnasingham 1998). Perceived Web security is the extent to which one believes that the Web is secure for transmitting sensitive information. In the case of purchasing products on the Web, it is possible that potential adopters may perceive that their credit card information may be at risk, and that they have no control over this (Salisbury, 2001). The lack of security, reliability and accountability make the Internet transactions too risky for many users (Aldridge et al. 1997). The issue of privacy and security relates to company's trustworthiness (Konradt et al. 2003).

Online transactions are subjected to both real and perceived security threats (Rose et al. 1999). Security concerns hinder customers from buying things online (Bhatnagar and Ghose 2002, Athiyaman 2002), affecting customer trust (Chellappa and Pavlou, 2002), purchase intention (Miyazaki and Fernandez, 2000), information satisfaction and benefit (Park and Kim, 2003), and increase reluctance in giving sensitive personal information (Suh and Han, 2003). Security is also playing an important role toward perceived usefulness (Liao and Cheung, 2002). The above evidences show that privacy and security can be considered as incurred cost.

2.5 User Involvement

User involvement has been conceptually defined and operationalized in several ways. Barki and Hartwick (1989) presented a rather complete review on this issue from different perspectives, i.e. information systems, psychology, marketing or consumer behavior, as well as organizational perspective. In information systems research, user involvement is commonly considered as "a set of behaviors or activities performed by potential users as they participate in different stages of the system development process" (Barki and Hartwick 1989, p. 55). This definition has also been used by Robey and Farrow (1982), Ives and Olson (1984), Baroudi et al. (1986), Franz and Robey (1986), Doll and Torkzadeh (1989), and Damodaran (1996). Barki and Hartwick (1989), however, preferred to use the term of "user participation" for this kind of involvement.

In marketing or consumer behavior, involvement refers to an individual internal state variable that refers to the importance and personal relevance of objects or activities, or tasks related to a product, e.g. information search and acquisition, product purchase, product consumption or use (Zaichkowsky 1985, Antil 1984). It is a causal or motivating variable influencing customer's purchase and communication behavior (Laurent and Kapferer 1985). To measure consumer involvement profile, Laurent and Kapferer (1985) proposed five antecedents or facets of involvement (p. 43):

- The perceived importance of the product,
- The perceived risk associated with the purchase which can be divided into risk importance (the perceived importance of negative consequences in case of poor choice), and risk probability (the perceived probability of making such a mistake),

- The symbolic or sign value attributed by the consumer to the product, its purchase or its consumption,
- The hedonic value of the product, its emotional appeal, its ability to provide pleasure and affect.

In psychology, user involvement is defined as psychological state of a person in terms of the importance that the person attaches to a given system (Barki and Hartwick 1989). User involvement is "based on inherent needs, values and interests that motivate one toward the object" (Zaichkowsky 1985, p. 342). According to Hartwick and Barki (1994), user involvement is a belief that "represents the information he has about the object … belief links an object to some attributes" (Fishbein and Ajzen 1975, p. 12). As such, user involvement refers to "the extent to which a person believes that a system [*an object*] possesses two characteristics, importance and personal relevance [*two attributes*]" (Hartwick and Barki 1994, p. 442).

Muncy and Hunt (1984) proposed five concepts that have been labeled as *involvement*: ego involvement, commitment, communication involvement, purchase importance, and response involvement. Communication involvement refers to the type of involvement that occurs during the course of a communication. It happened in a specific time, making it transitory and situationally specific; thus, externally motivated (e.g. utilitarianism) (Park and Young 1986). It does not happen before the communication start, and it ends when the communication stops. It is more likely to result in a goal-directed behavior (Hoffman and Novak 1996). With this unique conceptual definition, Muncy and Hunt (1984) stated that communication involvement is "particularly relevant in research on consumer information

processing" (p. 194). Different level of involvement will have an impact on individuals' processing of communication, e.g. information search (Krugman 1965). Furthermore, Krugman stated that communication involvement has been related to the amount and nature of attitude change.

Houston and Rothschild (in Muncy and Hunt 1984, p. 195) defined response involvement as "the complexity of cognitive and behavioral processes characterizing the overall consumer decision process." The level of response involvement, high or low involvement, determines how active (or passive) the customers are in their activities (e.g. information processing) to arrive at their optimal choices. High level of response involvement reflects a situation where consumers utilizing their maximum psychological and physical effort to obtain the best choices.

Based on user activity, Langer (1975) differentiates active from passive involvement. Individuals are considered to have an active involvement when they engage in a physical activity that requires some mental activities to complete that physical activity during task execution. Individuals are passively involved when they engage in a purely mental activity during task execution. Navigating a Website to find information of interest, for example, is considered an active involvement since it comprises both physical and mental activities, i.e. decision making (Jul and Furnas 1997).

In an attempt to differentiate involvement from attitude, Laurent and Kapferer (1985) employed four constructs, in which two of them were pleasure and importance. Pleasure reflects an affect that is a traditional measure of attitude (Fishbein and Ajzen 1975). Importance corresponds to the traditional measures of involvement (Barki and Hartwick 1989). These two constructs load distinctly differently (Laurent and Kapferer 1985). This is to show that involvement and attitude

are two different concepts, although they are significantly related (Barki and Hartwick 1989).

Barki and Hartwick (1994) stated that, “a system may be seen to be useful, but not necessarily important or personally relevant” (p. 62). As such, they suggested that in order to measure involvement, the evaluative part (i.e. attitude) should be excluded (Barki and Hartwick 1994). They distinguished importance subscale from personal relevance subscale. Importance subscale (in pair) includes essential-nonessential, fundamental-trivial, significant-insignificant, important-unimportant, and needed-not needed. Personal relevance subscale includes relevant-not relevant, and means a lot-means nothing.

In human computer interaction field, a system is called a user-friendly system if it can provide its user with an interface that can facilitate interface involvement. Interface involvement is “the ability of a user interface to facilitate users’ involvement with the information content presented to them” (Griffith et al. 2001, p. 136). Thus, user involvement is the outcome of user interacting with a system. It is argued that the longer the user interact with a system, the more involved he becomes, or otherwise. According to Houston and Rothschild (in Muncy and Hunt 1984) this is an example of response involvement in which the user’s activity is influenced by what he sees on the screen. It is also a communication involvement that will end when user no longer interacts with a system.

2.6 Mental Model and Internet Experience

2.6.1 Mental Model Theory

Mental model is “knowledge that the user has about how system works, its component parts, the processes, their interactions, and how one component influences

another" (Fein et al. 1993, p. 157). This mental model is supposed to help people in learning and understanding complex situation. It synthesizes several steps of a process and organizes them as a unit (Allen 1997). Mental models are "what people really have in their heads and what guides their use of things" (Norman 1983, p. 12). They are "the bridge between the work environment to be controlled and the mental processes underlying this control" (Rasmussen 1990, p. 43). They serve to qualitatively model the effects of changes in a system (William et al. 1983). It allows us to "both understanding problem situations and predict consequences of action contemplated for solving the problems" (Marchionini 1989, p. 56).

Mental model can be formed through training (e.g. Borgman 1999), based on a specific task (e.g. Olfman and Shayo1997, and Potosnak 1989), engaging in a particular activity like information search (Marchionini 1989, Navarro-Prieto et al. 1999, and Diaper 2002), through continuous exposure to a specific item, e.g. textbooks (e.g. Dillon 1991). It can also be formed by observation (Lokuge et al. 1996), and accidental encounters (Fisher 1991)

Training, with various supporting means, is one important method to increase user understanding of a particular system and at the same time gives some sort of experience to users. This has been demonstrated by several studies. Borgman (1999) and Muramatsu and Pratt (2002) showed how their subjects developed mental model on information retrieval system and search engine, respectively, by training them on a Boolean logic operation. However, not all of their subjects demonstrated what the authors were supposed to see. These findings support the assertion that mental models are incomplete (Norman 1983). Moody et al. (1996), equipped with animated conceptual model, showed that subjects presented with animation interacted more effectively and score higher on the test than those who presented with non-animated

model. Olfman and Shayo (1997) also showed that their subjects who have previous experience in database management system perform better on the given tasks than those who have not posses any experience.

User's mental model relates to the user's age - for some reason older users are more experience than the younger users - and habit. Marchionini (1989) showed that sixth grader students performed better in information seeking activity compared with third or fourth grader. Dillon (1991) showed that individuals who used to use certain text type possess a superstructure or model of that text which enables them to predict where information is located with high level of accuracy.

Gillan and Breedin (1990) call mental model as a cognitive model. In its relation with human-computer interaction, they define a cognitive model as

> "… a representation of a person's knowledge consisting of (1) a set of elemental concepts (elements in a model of an HCI might include windows, menus, tables, and graphics), (2) the relation among the elements (for example, a mouse and a touch screen might be related to as input devices, and (3) the relations among groups of associated elements (for example, a group of input devices might be related to a group of user-computer dialogue techniques)" (p. 391).

Mental models are created for a purpose – they do not exist as some sort of optional extra in the user's head (Green 1990). Norman (1986) cautions that "mental model is not formed from the conceptual model: it result from the user interprets the system image" (p. 47). According to Rasmussen (1990) that purpose is to assist users in finding appropriate actions to achieve their goals. He distinguishes categories of human behavior according to the ways of representing the properties of deterministic environment as a basis for control of action into skill-rule-knowledge (or SRK) framework. Van der Velden and Arnold (1991) called this framework as sensory level, perceptual-conceptual level, and intellectual level. Based on SRK framework, Rasmussen argues that it is at the knowledge level that the mental models are used.

There are several ways to use mental models: to figure out actions to perform, and to interpret the state of environment. Mental models are also used for repairing mistakes in performance on intended actions, and for learning how to do the tasks (Green 1990).

Mental models change as users gain more experience (Hawk and Wang 1999). Waern (1990) also argued that users might change their mental model while constructing it. The dynamic of the mental model also comes from the fact that

> "… the conceptual model or parts of it may be discarded and substituted by a new one. This means that either new objects or operations are conceived, or that old objects are given new characteristics" (p. 82).

When users are exposed to the same systems, they may have similarities and differences on their mental model. Ackerman and Greutmann (1990) stated that:

> "… individual differences in action regulation exist. We supposed that they are cause by different style of thinking. We know from work psychology that a given task will be redefined by the subject according to his own interpretation of the goals and degree of freedom." (p. 133).

Ackerman and Greutmann (1990) added that good problem solvers developed mental models that are closer to the conceptual model and functionality than do poor problem solvers. Good problem solvers may have more mental models as well. In short, expert mental models' are better organized than those of novices (Mayer 1997, Shayo and Olfman 1998).

2.6.2 The Influence of User Experience on Information Seeking Behavior

Web browsing activity is a recurring event where users predominantly repeat activities they had invoked before, while still selecting new actions from many other

that are available and possible (Choo et al. 2000). Its success depends on the user's ability to navigate the system (Rumpradit and Donnell, 1999).

Web experience influences users' information seeking strategies (Kellogg and Richards 1995). Due to some knowledge deficiencies (Hölscher and Strube 2000), novices tend to choose strategies that require less cognitive load (Marchionini and Shneiderman 1993). More experienced users have better ability in prioritizing search tasks as well as locating Websites (Khan and Locatis 1998, Lazonder et al. 2000). Several empirical studies have demonstrated this phenomenon.

By employing novices and more experienced Web users, Navarro-Prieto et al. (1999) focused their study on the cognitive strategies on Web searching. This study showed that experienced participants start with a plan for their search, while novice participants did not seem to start with any plan. Novice participants were highly influenced by what they saw on screen. The fact that novices tend to search unsystematically and spend little time in planning their search have also been reported by Spavold (1990), Marchionini (1995), Carlson and Kacmar (1999), and Bilal and Kirby (2002). When given an open task, novices prefer browsing to analytic search (Borgman et al. 1995, Large et al. 1998, Large et al. 1999). This finding implies that instead of thinking, planning, and evaluating, novices prefer to have more interaction with the system. This finding is consistent with Marchionini and Shneiderman (1993).

2.7 Summary

Information seeking is a complex process comprises several activities both mentally and physically. Mental activities include combination of several specific mental models related to a particular information problem that can be described

functionally and structurally (Marchionini 1989). Functionally, this combination of mental models controls search by

> "…extracting key concepts from the information problem, identifying criteria for search process, selecting candidate information sources, monitoring lookup (search) and examination procedure, and using result to modify itself" (p. 56).

Structurally, an information-seeking system includes

> "... a set of mental models associated with various information sources (databases and accompanying search systems), a set of mental models pertinent to a particular information problem (task domain knowledge), an historical record of past applications of the information seeking system (self awareness which allows analogy and checks context), and a set of rules for combining these components and monitoring progress" (p. 56).

Physically, what individuals do when they are seeking for information is just following a route by clicking information or icon towards the information they intent to search for. After finding what they are looking for, they may continue with other information, or just simply exit the process. So, basically, when individuals looking for certain information, especially on the Web, their main load will be on their mental activities, although they may never realize it.

Gatignon and Robertson's (1986) interpersonal communication framework consider the cost/benefit for both the information seekers and information providers or givers. The above discussion was only mentioned about the cost/benefit on the seekers side. However, this framework never mentioned about the cost/benefit related to the medium of communication. Website, as an online store, as mentioned earlier, is a medium of communication between sellers and buyers. As such, an expansion of the Gatignon and Robertson's (1986) model of interpersonal relationship is proposed as depicted in Figure 2.2. This model comprises three parts: provider block, Website as a medium of exchange (information, goods), and seeker block. While it is also important to consider both the provider and the seeker blocks, this study emphasize

the middle block, i.e. Website design elements, where seekers may get benefit and incur cost for their searching activity.

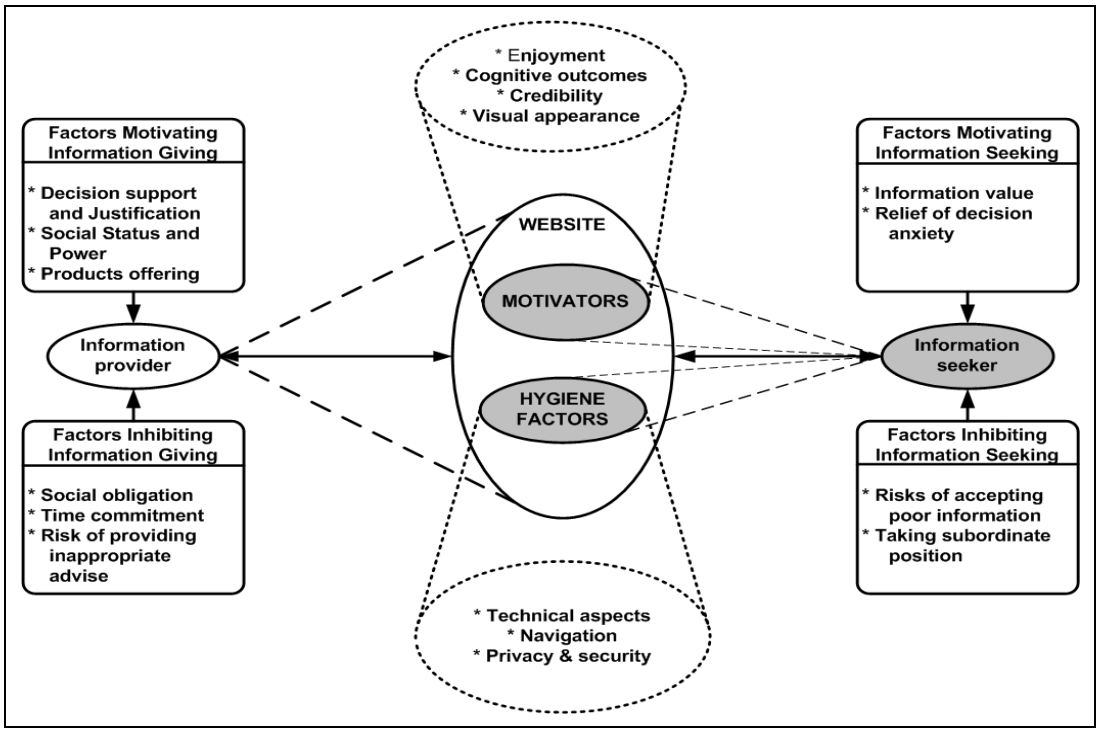

Figure 2.2 A proposed extension of the exchange theory model of interpersonal relationship of Gatignon and Robertson (1986).

Online store owners, as information providers, are willing to give away information related to products, because they want their customer to buy those products from them. In Figure 2.2, this is represented by a double-headed solid arrow to-and-from "Information provider" block to "WEBSITE" block. In one direction (Information provider → WEBSITE), this arrow shows the providers' incurred cost to prepare Websites. In the other direction (WEBSITE → Information provider), it shows the benefit the provider gets from people who visit his Website.

Information seekers are those who need to gather information from a Website to help them in the purchasing decision. It is represented by a double-headed solid arrow from "WEBSITE" block to-and-from "Information seeker" block. In one

direction (WEBSITE → Information seeker), this arrow shows the benefit that the seekers might obtain from visiting a Website. In the other direction (Information seeker → WEBSITE), it shows the seekers' incurred cost to visit Websites.

Figure 2.2 suggests that providers and seekers view the "WEBSITE" block differently (presented with dashed-lines). On one hand, providers will view a Website as a whole, i.e. they will not differentiate motivators from hygiene factors. On the other hand, in connection with a cost-benefit analysis, we argue that seekers will view or perceive Website design elements differently, i.e. as motivators and hygiene factors. This study focuses on the seekers' side.

As stated by Griffith et al. (2001), user involvement is a result of users interacting with a Website. In this case, users need to interact with a Website to find information of interest that may ends up with committing online purchase. During their interaction with a Website, users perceive Web design elements as the benefit and the incurred cost of the interaction. Based on whether users get more benefit than the incurred cost, or vise versa, they may decide to continue or stop their interaction. When users decide to continue with their Web surfing, it may improve their attitude toward online purchase as well as their satisfaction, which in turn affect their intention to purchase.

Chapter 3

RESEARCH MODEL AND HYPOTHESES

Due to several technological impediments (Rose et al. 1999), Web search cost related to Website design is inevitable. Apart from whether the seekers are able to find information of interest, they may or may not get any benefit from surfing a particular Website, but the incurred cost is unavoidable. Based on the above facts, we argue that when the perceived Web search benefit is greater than the perceived Web search cost, seekers will experience a positive Web search gain. As a result, they may prolong their usage, revisit the same Website, or continue with some other behaviors, like online purchase. On the other hand, when the perceived Web search cost is greater than the perceived Web search benefit, seekers will experience a negative gain. As a result, they may abort their activity, and may never revisit the mentioned Website.

This chapter presents a research model that will guide this study to answer the research questions. Since it focuses on the perceived benefit and cost, the proposed research model is called the Cost-Benefit model or CBM for short. The model is explained below. Words like user, customer, consumer, and individual throughout the rest of this thesis are used interchangeably.

3.1. Research Model

According to TRA and TPB, behavioral intention is influenced by user's attitude toward the behavior under consideration. Barki and Hartwick (1994) consider user involvement as a belief that, which according to TRA and TPB, influences user attitude. In their framework, Song and Zahedi (2001) show that this belief construct is

influenced by Web design elements. On the other hand, according to ECT, intention is also influenced by user satisfaction, which is determined by the confirmation when user's expectancy is met by the perceived performance.

User involvement is considered as a result of user interacting with, in this case, a Website (Griffith et al. 2001). When surfing a Website, a user expects to see something interesting, as well as to experience excellent performance. As such, we argue that user involvement can play a role as a confirmation of what a user wants to see and experience and what he really gets and perceives from surfing a Website.

Borrowing the two-factor model of Website design and evaluation (Zhang and von Dran 2000, Zhang et al. 2000), Web design elements that fall into motivators are considered as the perceived Web search benefit, and those that fall into hygiene factors are considered as the perceived Web search cost. It is argued that the more the user perceives the presence of Web design elements that fall into motivators, the more Web search benefit he gets. Also, the more the user perceives the presence of Web design elements that fall into hygiene factors, the less Web search cost he incurs.

When a user searches information in a Website, whether he gets the information he wants, he will also perceive and/or see the presence or absence of certain Website design elements. His perception might be influenced by his information seeking strategy. Due to the nature of different seeking strategies, each seeking strategies may influence the strength of the effect of the perceived Web design elements on user involvement differently.

Based on the above observations, the research model as depicted in Figure 3.1 is proposed. Figure 3.1 depicts all relationships among constructs under study. In this model, Web search strategy is an independent variable. Internet experience is a moderating variable. Online purchase intention is the final dependent variable. The

rest are mediating variables, comprising perceived Web search benefit, perceived Web search cost, user involvement, attitude toward online purchase, and user satisfaction.

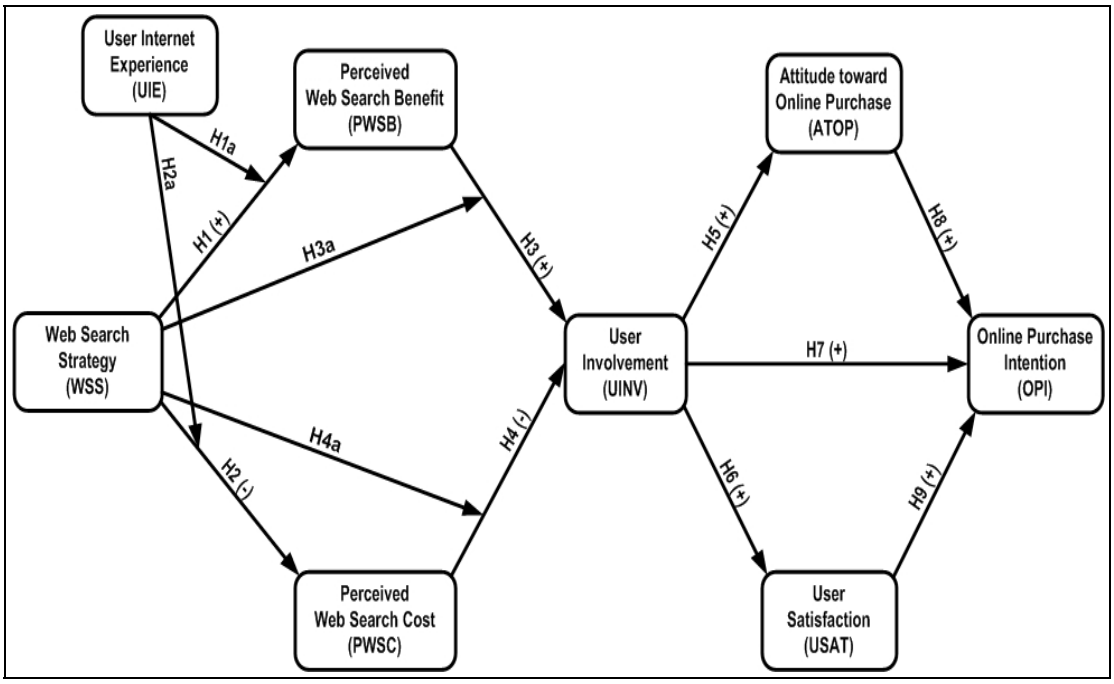

Figure 3.1 The research model.

3.2 Hypotheses Development

3.2.1 Web Search Strategy and Internet Experience

Many empirical studies on Web search strategy have shown that to complete a specific task, one strategy is often more dominant than the other. A study by Campagnoni and Ehrlich (1989) on a commercial hypertext-based help system revealed that browsing was the predominant strategy compared to the use of indexes they called “analytical search.” In their study, browsing was characterized by scanning tables of contents and paging through topics. One of their findings demonstrated the fact that novices predominantly used browsing strategy, which is a heuristic, and a highly interactive search strategy (Marchionini 1989). Schacter et al.

(1998) also revealed that children are interactive information seekers who prefer to browse rather than to plan or employ systematic and analytic search strategies. Scanning through table of contents and paging through topics allow users to move freely on a Website, which in turn affects their knowledge about the Website environment or design.

As explained by Marchionini (1995), seekers who employ analytical strategy make a careful plan before searching. This strategy starts with index entry points and follows the links until the information is found or all entry points are exhausted. On the other hand, seekers who employ browsing strategy rely on their ability to recognize relevant information heuristically and opportunistically. This strategy allows the seekers to move across or within screens, windows, records, and databases. Following these definitions, for the purpose of this study, a derivation of analytical strategy and browsing strategy is proposed, and it is called planned strategy and unplanned strategy, respectively.

The planned strategy is defined as a Web search strategy where the seekers deliberately plan their action before searching and follow strictly their plan to complete their information seeking tasks. With this restriction, the seekers will have no or very little chance to wander around the screen or across windows. The unplanned strategy is defined as a Web search strategy in which no plan is necessary for the seekers to start searching, thus the seekers can move freely on their will.

According to the above definition, seekers who employ the planned strategy have to strictly follow their search plan. As such, it is argued that this type of seekers will have fewer chances to wander around the Website compared to those who employ the unplanned strategy. In other words, seekers who employ the unplanned strategy will have more chance to navigate the Website, and to move across screen

and windows more freely. As a result, the unplanned seekers are able to perceive more Web design elements.

To have a better understanding about the difference of these two strategies, take a tourist who visits a downtown area to find a building named “Building A” as a metaphor of a user who surfs a Website to find information about certain product. User with planned strategy is like a tourist with exact route to find the intended building. In this situation, the tourist may not notice the “not relevant” buildings, although he actually passes through those buildings. The opposite situation happens when the tourist is on the free and easy program. When he passes through the downtown area slowly, even small and less popular buildings may attract him to stop for a while. This is like a user with unplanned strategy.

Bilal and Kirby (2002) examined Web search behavior of the seventh-grader students and graduate students based on the three realms stated by Kuhlthau (1991). They found that seventh-grader students and graduate students have differences and similarities in their search strategies. The differences were due to the difference in their navigational style and their ability to focus on the given tasks.

As explained in subsection 2.5, this study adopts the two-factor model of Website design elements of Zhang and von Dran (2000) in which Web design elements that fall into motivators category are considered as the manifestation of the perceived Web search benefits, and those that fall into hygiene factors category are the manifestation of the perceived Web search costs. The more the seekers perceived the existence of motivators, the more Web search benefits they get. The more the seekers perceive the existence of hygiene factors, the less Web search costs they incur. As such, it is argued that seekers with different strategies will perceive both

search benefit and search cost differently. Therefore, the following hypotheses are proposed:

H1: *Seekers who strictly follow a search plan will perceive less Web search benefit compared to those who do not follow any plan*

H2: *Seekers who strictly follow a search plan will perceive more Web search cost compared to those who do not follow any plan*

Experience is "an act of knowledge, one or more, by which single fact or general truths are ascertained; experimental or inductive knowledge; hence, implying skill, facility, or practical wisdom gained by personal knowledge, feeling or action," (http://www.selfknowledge.com/34085.htm). For this study, user Internet experience is defined as "everything felt, observed, perceived and learned through awareness and interaction with the Internet and the websites." It includes activities like information searching, buying products online, online gaming, etc. These activities are not limited to visiting just one particular Website. With their experience, users may have familiarized themselves with one particular Website's structure that they have more complete mental models compared to those who seldom or never visit the mentioned Website. Marchionini and Shneiderman (1988) relate experience to mental model by saying that

> "… users with little computer experience have more to learn and fewer mental models of related systems from which to draw analogies. These users depend heavily on experience with the system to develop their mental models." (p. 73).

When a user interacts with a new system, he will eventually create, unconsciously, a mental model of that system. This mental model is supposed to help

people in learning and understanding complex situations by synthesizing several steps of a process and organizing them as a unit (Allen1997).

Researchers have investigated that experience influences key constructs and their relationships, e.g. Taylor and Todd (1995), Szajna and Scamell (1993), and Venkatesh (2000). Taylor and Todd (1995), in particular, show how attitude toward behavior of experienced users relates differently to their intention compared to inexperienced users.

Internet experience is an important factor in understanding customer perception, attitude, and behavior in on-line environments (Liang and Huang 1998). Experience affects users' search strategies (Hsieh-Yee 1993). It increases user's confidence in his ability to master and use computers to achieve higher task performance (DeLone 1988, Kraemer et al. 1993). Users with higher Internet experience will perceive a Website structure less complex (Bruner and Kumar 2000), making it easier for them to gather as much information as possible.

User capability to take advantage of an information system increases with experience (Nysvenn and Pedersen 2004). Frequent visits to a particular Website will increase user's experience thus familiarity. Familiarity with a Website structure helps users to screen out competing stimuli so that they can concentrate on the focal stimulus (Bruner and Kumar 2000). Bruce (1999) shows how frequency of use influences satisfaction with the information seeking on the Internet. In general, the more frequent he visits, the more familiar he is with the Website structure.

Based on the above assertion, experienced users will be more focused on the search task and ignore other features of the Web that are not relevant. We also argue that seekers who employ the planned search will have less chance to wander around compared to those who do not employ any search plan. It is already mentioned also

that those who perceive more motivators will perceive more search benefit. When the above situations are combined, we will have a matrix of experience versus search strategy as depicted in Table 3.1.

Table 3.1 Matrix of experience versus search strategy.

	Experienced users	Novices
Planned search	A	B
No plan	C	D

The different situations depicted on Figure 3.2 can be explained as follow. It is argued that A would be the one who perceive the least Web search benefit and D would be the one who perceive the most Web search benefit. B would perceive more Web search benefit compared to A; the same situation happens for D compared to C. However, the difference between B to A is greater compared to the difference between D to C. Thus, when experienced seekers use planned search, the perceived benefits will drop a lot compared to those of novices. When experienced seekers use unplanned search, the drop will not be as much as the above. With the above argument, the gap in the perceived Web search benefit between the PG group and the UPG group will increase with experience. Following this observation, the following hypothesis is proposed:

H1a: *Higher Internet experience will increase the gap in the perceived Web search benefit between the two Web search strategies*

Following the same line of argument as the above and combine it with the assertion that those who perceive less Web design elements that fall into hygiene factors will incur more cost, the following situation can be explained by using Figure

3.2 as well. It is argued that A would be the one who incurs the most cost and D would be the one who incurs the least cost. B would incur less cost compared to A; the same situation happens for D compared to C. Thus, when experienced seekers use planned search, the perceived cost will increase a lot compared to those of novices. When experienced seekers use unplanned search, the increase of the incurred cost will not be as much as the above. Following the above argument, the following hypothesis is proposed:

H2a: *Higher Internet experience will increase the gap in the perceived Web search cost between the two Web search strategies*

3.2.2 User Involvement

When a user interacts with a Website, he is forced to perceive two different environments simultaneously: (1) the physical environment in which he is present, and (2) the virtual environment created in the context of the material presented through the medium (Steuer 1992), in this case, the Internet and a Website. Further, Steuer (1992) state that when interface involvement is high, one becomes more engaged to and concern about the material presented. In other words, higher interface involvement makes user more attentive to the virtual environment. On the other hand, where interface involvement is low, one maintains his concern with the physical environment more than he does to the presented material. It is argued that the longer users interact with a system, the more involved they become, and conversely. The longer the users interact with a system, the more benefits they get from their activity, and the less concern they have about the incurred cost.

According to Hoffman and Novak (1996), both intrinsic and extrinsic motivations influence user involvement. Intrinsic motivation is enduring, while extrinsic motivation is situational. These two types of motivators can be related to

Web design elements, although enjoyment and cognitive outcome (learning), which are intrinsic motivators, but they are the result of user interacting with a Website. On the other hand, visual appearance and Website credibility are two extrinsic motivators (Zhang and von Dran 2000).

According to Laurent and Kapferer (1985), risk also influences user involvement. Psychological risk related to lost of self-esteem (Funk et al. 2004) and frustration (Kuhlthau 1991) may emerge when user cannot find the intended information. Albers (2002) cautions that in the Internet, data may not be designed for integration or to be presented as coherent information. As such, out dated and/or inaccurate information force users to deal with functional risk. Due to technological impediments (Rose et al. 1999), users often have to deal with other functional risks like slow download, navigation difficulties, browsers and plug-ins incompatibility. To coupe with the above risks, users have to spend more of their time and effort. In other words, time and effort costs are embedded in the Website design elements.

As mentioned earlier, this study adopts the two-factor model of Website design (Zhang and von Dran 2000, Zhang et al. 2000). It is argued that Web design elements that fall into motivator category are the perceived Web search benefit, and those that fall into hygiene factors category are the incurred cost. As such, the following hypotheses are proposed:

H3: *Perceived Web search benefit will have a positive effect on user involvement*

H4: *Perceived Web search cost will have a negative effect on user involvement*

According to Kuhlthau's (1991) model of information seeking process (see Table 2.2), each stage of the information seeking process incorporates three realms, i.e. affective, cognitive, and physical. On the affective factors, uncertainty is the common situation when seekers start their seeking activity. The reason for this situation can be due to the unfamiliarity with the Web. It can also be due to the seekers who neither know what information they want to find, nor the page where they can start their seeking activity. As the seeking process continues, the common feelings like optimism, confusion, frustration, doubt and confidence may come and go. At the end of their seeking activity, they may feel happy, satisfied or relief because they have found what they want, or disappointed because they cannot find what they want.

The planned strategy forces the seekers to follow a search plan strictly, but it is not the case for the unplanned strategy. Thus, seekers who employ planned strategy could be more focused on the given task because their chance to wander around is more limited compared to those who employ unplanned strategy. On the other hand, seekers who employ unplanned strategy have more freedom to explore the Website content by exercising their navigational styles compared to those who employ planned strategy. As such, we argue that Web search strategies would moderate the strength of the effect of Web search benefit, and perceived Web search cost, toward user involvement.

H3a: *The strength of the positive effects of perceived Web search benefit on user involvement will be different for different seeking strategies*

H4a: *The strength of the negative effect of perceived Web search cost on user involvement will be different for different seeking strategies*

3.2.3 Attitude toward Online Purchase

Attitude refers to “the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question” (Ajzen 1991, p. 188). An attitude develops on the basis of evaluative responses to affect, cognition, or behavior. It is not directly observable but it can be inferred from observable responses. Thus, evaluative responses are those that express approval or disapproval, favor or disfavor, liking or disliking, approach or avoidance, attraction or aversion, or similar reactions (Eagly and Chaiken, 1993). Bem (1972) argues that attitude is derived from past behavior and people tend to infer attitude that is consistent with their prior behavior. It is also argued that people take into account the conditions under which they perform certain behaviors.

Eagly and Chaiken (1993) stated that attitude has three different classes of antecedents: cognitive process, affective process, and behavioral process. Cognitive category encompasses thoughts or ideas people have about attitude objects. It is often conceptualized as belief. Affective category consists of feelings, moods, emotions, and sympathetic nervous activities that people have experienced in relation to attitude objects, and they can be expressed in the statement of affects (Perloff 1993). Behavioral category consists of the overt actions people exhibit in relation to the attitude objects. It can also be expressed in verbal statement concerning some actions. These three antecedents may not altogether appear in attitude objects under evaluation. In fact, attitude could be based entirely on affective feelings (Oskamp 1991).

In TAM attitude is said to be influenced by perceived ease of use and perceive usefulness. Users cannot perceive whether a system is easy to use and useful until they interact with that system. This is to imply that perceived ease of use and

perceived usefulness are the results of interaction. It is already mentioned that user involvement is also an outcome of users interacting with a system. Besides, researchers have revealed that user involvement has several consequences on attitude (e.g. Andrews and Shimp 1990, Petty et al. 1983). Barki and Hartwick (1994) stated that user involvement refers to a belief, where in the Theory of Reasoned Action (Fishbein and Ajzen 1975) and the Theory of Planned Behavior (Ajzen 1991), a belief is said to be the antecedent of attitude. Thus, the following hypothesis is stated:

H5: *User involvement will have a positive effect on user attitude toward online purchase*

3.2.4 User Satisfaction

Bailey and Pearson (1983) defined user satisfaction as "the sum of one's feelings or attitudes toward a variety of factors affecting that situation" (p. 531). This definition may create confusion on how satisfaction differs from attitude. Latour and Peat (1979) stated that satisfaction is synonymous with attitude and emotion because all of them connote affect. Based on the synonymy of these three constructs, Hunt (1977) argued that attitude is an emotion, and satisfaction is an evaluation of that emotion. Furthermore, attitude and satisfaction differ in their predictive abilities (Tse and Wilton 1988). Bem (1978) argued that attitudes derive from past behavior and people tend to infer attitudes that are consistent with their prior behavior. Attitude transcends all prior experiences, thus more enduring, compares to satisfaction that is experience-specific affect, thus more transient (Oliver 1980, 1981).

Satisfaction is a state of mind that represents the composite of users' emotional and material responses to a particular activity, e.g. information seeking within the Internet (Bruce 1999). User will emotionally be satisfied because the

outcomes match their requirements and expectations (Tessier et al. 1977, Applegate 1993), task orientation and goal determination (Waern 1989, Hiltz and Johnson 1989). On the other hand, users will materially be satisfied as a result of their experience associated with system usage. By using and interacting with a system, users will have better understanding of "factors associated with various features of an information system's performance (Bruce 1999, p. 541). Satisfaction is considered as one of the most important measures of information systems success (Zahedi et al. 2001)

In the context of Website documents, satisfaction is defined as "the overall feelings of the reader regarding the experience of reading the web document" (p. 95). Satisfied users may prolong their website usage, revisit it, and may recommend it to others (Zhang and von Dran 2000). Hence, user satisfaction is a highly desirable Web design goal. User satisfaction, as one measure of the Website success factors, is influenced by the Website navigability, interactivity, and its content (Palmer 2002). According to Zahedi et al. (2001), one antecedent of overall satisfaction with the Web design is website usability, which can be measured based on its perceived usefulness and perceived ease of use (Davis et al. 1989). Perceived usefulness relates to the enhancement of users' ability to perform their job, whereas ease-of-use relates to the format and friendliness of the system (Doll and Torkzadeh, 1988). Zahedi et al. (2001) stated that "overall satisfaction (with the Web design) could be elicited by questions such as whether readers would be willing to read such a document again and would recommend it to others: whether the process was enjoyable and satisfactory, and whether the outcome met readers' expectations" (p. 95).

Zahedi et al (2001) also defined reliability, comprehensibility and clarity as the factors that influence the effectiveness of Web documents, with in turn influence the overall user satisfaction. Information reliability refers to information accuracy,

trustworthiness, dependability, and credibility. Clarity refers to the readers' perception that the document's language is clear, precise and relevant. A word or a sentence is ambiguous if there are two or more valid meanings, and readers have a hard time to choose among the alternatives (Brusaw et al. 1997). Comprehensibility refers to "the readers' perception of texts' readability, understandability, organizational coherence, and the accessibility of textual meaning" (Zahedi et al. 2001, p. 95).

Readability refers to the quality of written language that makes it easy to read and understand (http://www.cogsci.princeton.edu/cgi-bin/webwn). Bailey and Pearson (1983) demonstrate how readability affects user satisfaction. Understandability refers to the degree to which the purpose of the system or component is clear to the evaluator (Boehm et al. 1978). In the context of a Web document, it means that readers can grasp the meaning and purpose of the text (Zahedi et al. 2001). Organizational coherence refers to consistent text organizations and patterns throughout the larger textual units. Accessibility refers to ensuring the content that can be navigated and read by everyone, regardless of location and experience (http://www.murdoch.edu.au/cwisad/ glossary.html). It depends on the readers' level of knowledge and understanding.

User involvement with information presented to a user is a key driver of his responses. Impacts of user involvement toward user satisfaction have been reported by Amoako-Gyampah and White (1993), Hwang and Thorn (1999), Mahmood et al. (2000), and Blili et al. (1998). It is argued that user involvement will have a significant effect on user satisfaction. Therefore the following hypothesis is proposed:

H6: *User involvement will have a positive effect on user satisfaction*

3.2.5 Online Purchase Intention

Table 1.1 shows a number of previous studies that investigate factors affecting intention to purchase. All factors, except previous purchase experience (Shim et al. 2001) and consumer familiarity (Söderlund 2002), can be referred to Web design elements. For example, Kavanoor et al. (1997) demonstrate that advertising format and advertising credibility affect purchase intention. Advertisements are very common in commercial websites. Advertisement size is used to indicate product or service quality (Kirmani 1990), company reputation and credibility (Moriarty 1986), and how big and prosperous the company is (Hoque and Lohse 1999). Perceived store size affects purchase intention (Jarvenpaa et al. 2000, Konradt et al. 2003). Website usability and website background also affect purchase intention (Konradt et al. 2003, Stevenson et al. 2000).

It was mentioned that user involvement is a result of users interacting with a system, e.g. Website. Higher levels of involvement stimulate users to be more attentive to the information presented to them (Petty and Cacioppo 1979, Petty et al. 1983). By interacting with a Website, users are able to perceive the presence or absence of Web design elements that may influence their intention to purchase. Involved subjects are found to magnify their evaluations of their shopping experience (Swinyard 1993). As such, the following hypothesis is stated:

H7: *User involvement will have a positive effect on purchase intention*

TRA and TPB posit that behavioral intention is determined by attitudes toward that behavior. In the Technology Acceptance Model, or TAM (Davis 1989, Davis et al. 1989), intention is a function of attitude, where attitude is determined by perceived

ease of use and perceived usefulness. Many studies based on TRA, TPB, and of course TAM, have shown that attitude toward certain behavior indeed affects intention toward that behavior, e.g. Al Gahtani and King (1999), Athiyaman (2002), Muthitacharoen et al. (2002). As such, the following hypothesis is stated:

H8: *Attitude toward online purchase will have a positive effect on online purchase intention*

ECT posits that satisfaction with a product or service is the primary motivation for its continuance, while dissatisfied users discontinue it and/or switch to alternative services (Bhattacherjee 2001a, 2001b). Satisfied customer is more likely to perform certain behavior (Anderson and Sullivan 1993). Empirical studies have shown how satisfaction affects intention, e.g. Oliver (1980), Oliver and Linda (1981), Anderson and Sullivan (1993), and Lee and Lee (2003). To further confirm this claim, the following hypothesis is proposed:

H9: *User satisfaction will have a positive effect on online purchase intention*

Having proposed several hypotheses that will be used to answer the research questions, next chapter explains the research methodology.

Chapter 4

RESEARCH METHODOLOGY

This chapter presents the research methodology for this study. A laboratory experiment, followed by a post-experiment survey, was conducted. This chapter comprises three main sections. The first section contains the description on how the independent variable, the moderating variable, and the dependent variables were operationalized. Partial Least Square (PLS) will be used to analyze the data (see Chapter 5). It will be explained that PLS allows researchers to combine reflective and formative latent variables in one model. As such, while the first section describes the operationalization of variables, a note must be taken that all variables will be treated as reflective variables unless they are stated differently.

Preceded with the arguments why students were employed as the subjects of the experiment, the second section explains the detail of the pilot study along with its result and its drawbacks. Identifying such drawbacks in the pilot study is very important so that the same drawbacks will not reappear in the real experiment. The third section explains how the real experiment was conducted. The discussion about the real experiment begins with an explanation on how the participants were gathered and grouped. A minor adjustment on the experiment process was made due to the pilot study's drawbacks. At the end of this chapter, a descriptive statistics of the real experiment is presented.

4.1 Constructs Operationalization

4.1.1 Independent Variable

Two Web search strategies were used in this study, namely planned strategy and unplanned strategy. Planned strategy is defined as a Web search strategy where seekers deliberately plan their action before searching and follow strictly their plan to complete their information seeking tasks. Unplanned strategy is defined as a Web search strategy in which no deliberate plan is necessary for the seekers to start searching. These two strategies were derived from the analytical and the browsing strategy (Marchionini 1995), respectively. In the experiment, the planned strategy was operationalized by asking the participants to write down their plan before they were allowed to start searching.

4.1.2 Moderating Variable

This study uses one moderating variable, that is, user Internet experience (UIE). It is defined as "everything felt, observed, perceived and learned through awareness and interaction with the Internet and websites and Web search related activity" (a modification of http://www.hallmark-consulting.com/expertise/user_ experience.html). This variable is measured with three 7-point Likert scale items to indicate their level of experience using the Internet, and its usage to search information. In this measure, "1" means "no experience", and "7" means "extensive experience." The items were adopted and modified from Ford et al. (2003).

4.1.3 Dependent and Intervening Variables

As shown in the proposed research model (see Figure 3.1), there are six dependent variables, in which the final dependent variable is online purchase intention

(OPI). The other five variables can be considered as intervening variables. They are perceived Web search benefit (PWSB), perceived Web search cost (PWSC), user involvement (UINV), attitude toward online purchase (ATOP), and user satisfaction (USAT). These dependent variables were operationalized as follow.

4.1.3.1 ***Perceived Web Search Benefit***

Perceived Web search benefit (PWSB) is defined as the benefit the seekers get during their Web search activity. It is manifested as the perceived of the existence of Web design elements that belongs to motivators and related feelings that the seekers perceive during their activity. It has been argued that the more motivators are perceived, the more benefit the subjects will get. The items for this variable were adopted from the list of motivators in Zhang and von Dran (2000) (see also Zhang et al. 2000). They were taken from the categories that clearly showed strong motivational features: cognitive outcome, enjoyment, credibility, and visual appearance (Zhang et al. 2000). Items in this variable may not be correlated to each other. As such, perceived Web search benefit will be treated as a formative variable.

Perceived Web search benefit was measured using nine items belonging to the above categories. Table 4.1 presents the mapping of these items presented in Appendix A.5, section II, to the four motivational features of motivators employed in this study.

As shown in Table 4.1., some items, like item 1 to item 4, might not obviously related to the Web design elements, because their emphasis is on the user's feelings. For example, learning new knowledge can be related to the Website content, while leaning new skills can be related to the Website navigation. The Website is fun to explore because it provides a lot of fun stuffs, like animation or back ground music.

The users enjoy exploring the Website as the result of simple yet effective navigation structure, thus, easy to use.

Table 4.1 Mapping of items into motivators.

Motivational Features	Items used to measure the motivational features
1. Cognitive outcome	1. I have learned ***new knowledge*** from this Website 2. I have learned ***new skills*** from this Website
2. Enjoyment	3. It was ***fun*** exploring this Website 4. I ***enjoyed*** exploring this Website 5. This Website **features** a ***multimedia*** presentation
3. Credibility	6. This Website is owned by a ***reputable*** person/company 7. This Website has achieved ***external recognition*** (e.g. visitor counter, awards)
4. Visual appearance	8. This Website has an ***attractive appearance*** 9. This Website is ***visually appealing***

Of the above items, participants were asked to express their agreement/ disagreement to the respective sentences. A 7-point Likert scale was used to measure participants' perception for each stated statement, in which "1" means "Strongly disagree," and "7" means "Strongly agree."

4.1.3.2 ***Perceived Web Search Cost***

Perceived Web search cost (PWSC) is defined as the incurred cost during the Web search activity. It is manifested as the perceived of the existence of Web design elements that fall into the hygiene. It has been argued that the less hygiene factors are

perceived, the higher the participants incur the cost. The items for this variable were adopted from the list of hygiene factors in Zhang and von Dran (2000) (see also Zhang et al. 2000). They were taken from the categories that clearly identified hygiene categories: technical aspects, navigation, and privacy & security (Zhang et al. 2000). As with motivators, items in this variable may not be correlated to each other. As such, perceived Web search cost will also be treated as a formative variable.

Table 4.2 Mapping of items into hygiene factors.

Hygiene factors	Items used to measure the hygiene factors
1. Technical aspects	10. This Website gives a ***very fast response/loading time***
	11. This Website supports ***different browsers***
	12. This Website has a ***loading/processing indicator***
2. Navigation	13. This Website provides an ***effective*** navigation aids
	14. This Website provides a ***clear direction*** for navigating the Website
	15. This Website gives a ***clear indication of user location*** for navigating the Website
3. Privacy & Security	16. This Website provides information on ***how*** user's information is collected
	17. This Website provides information on how collected user's information ***will be used***
	18. This Website gives assurance that user's information will be ***transmitted securely***
	19. This Website provides an ***access requirement*** (e.g. password) to allow user to access sensitive information.

Perceived Web search cost was measured using ten items belonging to the above categories. Table 4.2 presents the mapping of these items presented in Appendix A.5, section II, to the three categories of hygiene factors employed in this

study. Items were in the form of sentences related to the Web design elements that fall into hygiene factors. Participants were asked to express their agreement/disagreement about these sentences. A 7-point Likert scale was used to measure participants' perception for each stated statement, in which "1" means "Strongly disagree," and "7" means "Strongly agree."

4.1.3.3 ***User Involvement***

User involvement (UINV) is defined as the degree to which users feel involved with a Website as a result of their interaction (modified from Peter and Olson 1996). For this study, user involvement is operationalized as the degree to which the interaction with a Website during Web search activity is important and personally relevant. There are seven items used to measure user involvement. Items were adopted from Barki and Hartwick (1994). These seven items can be divided into two groups. The first five items, i.e. *essential*, *fundamental*, *significant*, *important*, and *needed*, are to measure the importance of the interaction. The other two items, i.e. *means a lot* and *relevant*, are to measure the personal relevance.

The items were assessed on the 7-point semantic differential scale (or bipolar scale), where "1" and "7" point to the opposite extreme sides, e.g. extremely essential and extremely non-essential, respectively. The word provided for each item was supposed to complete the following sentence: "After using this website, I feel that using this website is ....."

4.1.3.4 ***Attitude toward Online Purchase***

Attitude toward online purchase (ATOP) is defined as the degree of favor or disfavor toward a behavior of an online product or service purchasing at a particular

Website (modified from Fishbein and Ajzen 1975, Eagly and Chaiken 1993). Seven items were used to measure attitude toward online purchase. They were adopted from Al-Gahtani and King (1999), Teo et al. (2003), van der Heijden et al. (2003), and Barki and Hartwick (1994). As with user involvement, these items were assessed using the 7-point semantic differential scale (bipolar scale), where "1" and "7" point to the opposite extreme sides, e.g. extremely foolish and extremely wise, respectively. The word provided for each item was supposed to complete the following sentence: "Considering all design factors I have perceived from the website I just used, my using this website to buy things online is ....."

4.1.3.5 ***User Satisfaction***

User satisfaction (USAT) is defined as the overall feelings of the participants regarding the experience of using a Website to conduct an information search (modified from Zahedi et al. 2001). Four 7-point Likert scale items were used to measure user satisfaction and they were adopted from Lee et al. (2003) and Teo et al. (2003). Participants were asked to express their agreement/disagreement of the provided sentences, where "1" means "Strongly disagree," and "7" means "Strongly agree."

4.1.3.6 ***Online Purchase Intention***

Online purchase intention (OPI) is defined as the degree to which the subject is inclined to purchase a product or service at a particular website (van der Heijden et al. 2001). Items for this variable were adopted and modified from Song and Zahedi (2001). Four items were used, and they were measured using 7-point Likert scale.

Participants were asked to express their agreement/disagreement of the provided sentences, where “1” means “Strongly disagree,” and “7” means “Strongly agree.”

4.1.4 Manipulation Check Items

Since this study operationalizes two groups of subjects, manipulation check items are needed to differentiate one group from the other. The items for manipulation check used in this study were derived from the definition of analytical strategy as well as browsing strategy (Marchionini 1995), and were adopted from Navarro-Prieto et al. (1999) and Swanson (1989).

All the above items are listed in Appendix A.5. The word “this website” refers to www.amazon.com.

4.2 Website and Participants

Since the main purpose of this study is to observe online purchase intention as a result of different Web search strategies, a commercial Website was used, i.e. www.amazon.com. Amazon.com was chosen for this experiment because of several reasons including:

- Amazon.com is a B2C Website that sells various products. These products are grouped into several categories. Along with its design, it mimics a retail store as stated by Spiller and Lohse (1998). For example, the shopping cart mimics a checkout cashier, screen layout mimics a retail store atmosphere, products grouping mimics different aisles or department on a retail store.
- Amazon.com also provides a search engine that mimics sales clerk services;

- It has simple navigation structure that allow its customers to move around easily, just like in store signage that allow customers to move from one aisle to another or to move from one level to another quite easily.
- It has a multi lingual feature (but this study only use the English version).It also provides its customers with privacy notice.
- Several famous company logos are also displayed. These logos can boost customers' confident in buying products from this amazon.com.
- Amazon.com also provides space to its users who want to sell their unwanted products.

Many studies on consumer behavior had taken students as their subjects (e.g. Goldsmith and Goldsmith 2002, Fiore and Jin 2003, Zhang et al. 2000, Lee et al. 2005, Jiang et al. 2000, van der Heijden and Verhagen 2004, Jarvenpaa et al. 2000, Lafferty and Goldsmith 1999, and Söderlund 2002). Following their steps, this study also employs students as the experiment subjects. The rationales include the fact that students have "reasonably extensive adult consumer experience" (Dittmar et al. 1995, p. 497); students represent a major market segment of today's online shopping (Jiang et al. 2000); students are relatively Internet savvy that they do not need any extra training.

4.3 Pilot Study

A pilot study was conducted prior to the real one. The purpose of the pilot study mainly was to check the general procedure and to test the reliability and validity of the questionnaire items. The pilot study was conducted with the help of 30 students comprising 14 undergraduate students (13 male and 1 female) and 16 graduate students (14 male and 2 female). These students were voluntarily registered to

participate after they were sent an invitation email. Due to the limitation of the laboratory space, the pilot study was conducted in two sessions on different days. Undergraduate students participated in the first session, and graduate students participated in the second session.

4.3.1 Participants Grouping

Participants in each session were divided into two groups, namely the planned group (PG), and the unplanned group (UPG). The grouping proceeded as follow. After participants were seated, they drew lots to determine who would be in which group. In the lot, there was equal number of PGs and UPGs, according to the number of participants, written in a rolled piece of paper and put in the box. That way, participants were not able to see what was written in every piece of paper. This is to make sure that randomization of participants was obtained. Each participant took one rolled piece of paper one after another. Based on what was written in that piece of paper, participant was placed either in the PG group or in the UPG group, accordingly.

4.3.2 The Pilot Experiment

In general, each of the pilot experiment session went on as follows:

- Participants were admitted to the laboratory and be seated anywhere they like. The introduction was given to explain the purpose of the experiment and how the experiment would be ran.
- After the introduction, participants were given a practice, the same as the real experiment about to come. This was also to give them a chance to familiarize themselves with www.amazon.com, if they never use it before. Although

amazon.com may a very well-known Website, not all of the participants may have been using this Website. In this practice session, participants were given a task to find information about one product from www.amazon.com. For the PG group, participants were asked to write down clearly their search plan before start searching. For the UPG group, participants were allowed to start searching right away. The task for practice session is presented in Appendix A.1.

- Following the practice and familiarization, the pilot experiment commenced. In this experiment, participants were given task to find three different products, in which two of them were predetermined products, and the third was a product of their own interest. Again, as in the practice session, participants in the PG group had to write down their search plan before they were allowed to start searching. While participants in the UPG group were allowed to search soon after they received the task instruction. Appendix A.2 presents the task for practice session.
- After all participants finished their tasks, participants were asked to complete a post-questionnaire survey asking about their experience during the experiment. Then, they were dismissed after being rewarded with a token of appreciation. The questionnaire items are presented in Appendix A.5.

4.3.3 The Pilot Study Result

4.3.3.1 ***Internet Experience***

At the end of the experiment, participants were asked to complete the survey questionnaires. All participants returned the complete questionnaires.

Internet experience was measured using three 7-point Likert scale items, where "1" means "No experience," and "7" means "Extensive experience" (see Appendix A.5). Table D.1 (see Appendix D) shows, refers to the "Combined Items"

row, that the mean for the PG group is 5.04 (standard deviation = 0.999), and the mean for the UPG group is 5.51 (standard deviation = 0.916). Based on this result, they were further assessed to check whether subjects' Internet experience in both the PG group and the UPG group was statistically different. By referring to Table D.2, no statistical difference was found. This result shows that subjects in both groups have roughly the same Internet experience.

4.3.3.2 ***Descriptive Statistics***

Table 4.3 shows the descriptive statistics for the reflective variables with N = 30. As stated earlier, items for manipulation check used in the pilot study comprises of the first five items presented in Appendix A.5. From the Cronbach's alpha scores, it can be observed that, except for the manipulation check, all variables satisfy Nunnally's (1978) reliability criterion of being greater than 0.7. As such, items in these variables will be used in the real experiment.

Table 4.3 Descriptive statistics from the pilot study (N = 30).

Variable	**Statistics**		
	Cronbach Alpha	**Means**	**St. Dev.**
Manipulation check	0.499	5.000	0.923
User Internet Experience	0.919	5.278	0.971
User Involvement	0.845	4.757	0.869
Attitude toward Online Purchase	0.926	4.971	1.056
User Satisfaction	0.855	5.008	1.043
Online Purchase Intention	0.704	4.100	1.203

Table 4.3 shows that the Cronbach's Alpha for manipulation check variable is less than the minimum value of 0.7. As such, the manipulation check combined items was not reliable; thus this combination cannot be used to separate the PG group from

the UPG group. Based on this result, an individual item was assessed to check whether they, as individual item, could separate the PG from the UPG group. The results are shown in Table D.3 and Table D.4. The results suggest that neither a combined items nor an individual item was able to separate the PG group from the UPG group. This drawback is explained in section 4.3.4.

4.3.3.3 ***Multicollinearity Check***

As stated earlier, two formative constructs were used in this study. They were perceived Web search benefit that was manifested as the perceived motivators, and perceived Web search cost that was manifested as the perceived hygiene factors, respectively. Formative indicators measurement model is based on a multiple regression, where multicollinearity is an important concern (Diamantopoulos and Winklhofer 2001). The stability of indicator coefficients is affected by the sample size and strength of the indicator intercorrelations. To assess multicollinearity, two measures can be used: the ***tolerance*** value and its inverse i.e. ***variance inflation factor*** (VIF) (Neter et al. 1996). These measures tell us the degree to which each indicator is explained by the other indicators. Tolerance is the amount of variability of the selected indicator not explained by other indicators. A common cut-off threshold for tolerance is 0.1 that corresponds to a variance inflation factor value of 10. Thus, tolerance < 0.1 and VIF > 10 are indications of multicollinearity problems. Table D.5 and Table D.6 show that there is no indicator in both perceived Web search benefit and perceived Web search cost with a tolerance value of < 0.1 or VIF > 10. As such, the data obtained from the pilot test show that there is no multicollinearity problem in both formative indicators. As such, all items in both perceived Web search benefit and perceived Web search cost were all used in the real experiment.

4.3.4 Pilot Study Drawbacks

Several drawbacks of the pilot study need to be addressed. The first drawback of the pilot study lies on the fact that in one session both the PG group and the UPG group were mixed. This situation created some confusion to the participants since some of them might not have heard or understood the different instructions very clearly. Those who were assigned to be in different groups were supposed to do different. This problem was rather obvious for the undergraduate group. They also tended to have discussions during the course of the experiment, which they were supposed not to.

Based on this experience, for the graduate group, seating arrangement was enforced. Participants from both groups were seated in alternate positions, i.e. PG1, UPG1, PG2, UPG2, etc.

The second problem was the lack of discipline from the PG group. They were to conduct the search after they had finished writing their search plan. However, some of the participants did not follow this procedure.

The third problem came from the relatively slow Internet connection used in this experiment. The speed of the Internet connection used in this experiment was only 128 Kbps. Due to the slow connection speed, some participants had to wait longer than the others in order for them to get the same screen. This problem was not possible to be remedied.

The above problems could be the reason why the items for manipulation check were not able to separate the PG group from the UPG group. It might also be due to the fact that the subjects did not know exactly the difference between several terms used in these items. For example, they might not know the difference between the word “search strategy” and “browsing strategy.”

4.4 The Real Experiment

After reviewing the result of the pilot study, several changes were made before the real experiment was conducted. From Table 4.3, Table D.3, and Table D.4, it can be observed that manipulation check was not able to differentiate the PG group from the UPG group in the pilot study. As such, these items were not used in the real experiment. Another manipulation check item was used, instead. This item will be explained in section 4.4.3.3. All other variables were used in this experiment since their reliability scores satisfy Nunnally (1978). As for the formative variables, i.e. perceived Web search benefit and perceived Web search cost, Table D.5 and Table D.6 show there is no multicollinearity problem detected on these variables. Thus, all items in these formative variables were used in the real experiment.

4.4.1 Participants Gathering and Grouping

For the real experiment, undergraduate students from a Singapore university were gathered. A total of 235 students (121 male and 114 female), from 6 different faculties, participated in this study. They include first year to fourth year undergraduate students. As with the pilot study, participants voluntarily participated in this study after they were sent an invitation email. When they registered to participate, they chose one of the six available experiment time slots, across 3-day experiment period, each comprises maximum of 49 seats (the maximum number of seats in the laboratory used for the experiment).

When students were registering to participate in this study, they were not told to which group they would be assigned. They only had to choose their preferred time slot. Only after the registration was closed, participants in each time slot then was assigned either as the PG group or the UPG group randomly without their prior

knowledge. As such, there were three time-slot-based groups were assigned as the PG groups and the other three were assigned as the UPG groups. This strategy was adopted to avoid instruction confusion that happened in the pilot study, and to make sure that all participants receive the same information and experiment instructions.

4.4.2 The Experiment Process

The experiment proceeds in the same manner as the pilot study. It comprised a practice session and a real experiment session. For the PG group, to make sure that participants did not start searching until they had finished writing their search plan, they were asked to switch the monitor off. During this time, subjects were not allowed to continue to the next step before all subjects in the same session have finished with their search plan writing. The number of tasks in this real experiment was also different from the pilot study. For this experiment, participants were asked to find information pertaining to four different products. Three of these products were predetermined, and the forth was a product of their own interest. The complete listing of the task is presented in Appendix A.3 and Appendix A.4.

4.4.3 The Result

4.4.3.1 ***Distribution of the Subjects***

Table 4.4 presents the distribution of the subjects participated in the real experiment.

4.4.3.2 ***Internet Experience***

At the end of the experiment, participants were asked to complete survey questionnaires. All 235 participants returned the questionnaires and all the returned

questionnaires were complete.

Table 4.4 Distribution of the subjects.

Faculty / School	Male				Female				Total
	1*	2*	3*	4*	1*	2*	3*	4*	
Art & Social Sciences	3	3	8	-	2	14	13	5	48
School of Business	1	3	5	1	5	3	4	-	22
School of Computing	21	17	6	-	4	8	1	1	58
School of Design & Environmental	3	6	-	-	2	7	3	-	21
Engineering	16	18	-	1	6	6	1	4	52
Science	4	5	-	-	18	6	1	-	34
Total	48	52	19	2	37	44	23	10	
Grand total	121				114				235

***** Year of study

As with the pilot study, Internet experience in this experiment was measured using three 7-point Likert scale items the same as in the pilot study, where “1” means “No experience,” and “7” means “Extensive experience.” These items are presented in Appendix A.5. Table E.1 shows (refers to the “Combined Items” row) that the mean for the PG group is 5.17 (standard deviation = 1.065), and the mean for the UPG group is 5.31 (standard deviation = 0.960). Based on this result, they were further assessed to check whether Internet experience in both the PG group and the UPG group was statistically different. By referring to Table E.2, no statistical difference was found. This result shows that subjects in both groups have roughly the same Internet experience.

To compare Internet experience in both the pilot study and the real experiment, t-test was also conducted. From the result of the t-test, see Table E.3 and Table E.4, it can be observed that participants in the pilot study and the experiment roughly have the same Internet experience. The mean for the pilot study is 5.28 (standard deviation = 0.971) and that for the real experiment is 5.24 (standard

deviation = 1.012). This result shows that subjects in the pilot study and in the real experiment have no difference in their Internet experience. They all were considered as experience seekers and their Internet savviness is undoubted. This is to support the rationale why students were employed in this study.

4.4.3.3 ***Manipulation Check***

It was mentioned that, in the pilot study, five items used for manipulation check were not able to separate the PG group from the UPG group. The five items used for manipulation check were derived from Marchionini (1995) and Navarro-Prieto (1999). The keywords for these five items are “searching”, “browsing”, “top-down,” and “bottom-up.” It seemed that subjects did not understand the different between these words. As such, these items were not used in the real experiment. Instead, a single item was used. The keyword used in one single item manipulation check is “trial and error.”

The words “trial” and “error” cannot be separated, because “trial and error” itself is an idiom that is commonly used. The word “error” itself might indicate negative meaning. However, as an idiom, “trial and error” is one word. In the context of information seeking strategies, “trial and error” involves two processes, i.e. exploratory process and elimination process (Swanson 1987, 1989). In other words, it is similar to “explore and exclude”, i.e. to explore what is available and to exclude the irrelevant information. Exploratory process and elimination process are two stages mentioned and implied in the model of information seeking process proposed by Kuhlthau (1991).

This single item that was used to check the experiment manipulation is stated in this sentence: “I …… used a trial and error approach to find information on this

Website."Subjects were asked to complete this sentence by using 7-point Likert scale, where "1" means "Very seldom," and "7" means "Very frequently."

The descriptive statistic presented in Table 4.5 shows that the mean for PG group is 3.77 (standard deviation = 2.01), and the mean for the UPG group is 4.56 (standard deviation = 1.865). The t-test then needs to be conducted to check whether these two means were different.

Weinberg and Abramowitz (2002) stated that in order to have a valid t-test to compare the means of two groups, two conditions must be met: 1) both groups are normally distributed, and 2) both groups have equal variances or they have homogeneity of variances. The first condition can be evaluated by checking their kurtosis and skewness as a measure of normality in which their values can be obtained from descriptive statistics obtained from SPPS. The second condition can be evaluated with Levene's test of equality of variances that can be obtained directly from running t-test on SPSS.

One way to examine normality is by assessing their kurtosis and skewness (George and Mallery 2003). Kurtosis is a measure of the "peakedness" or "flatness" of a distribution. A kurtosis value of ±1.0 is considered excellent, but a value of ±2.0 is also considered acceptable. Skewness is a measure of the extent a distribution of values deviates from symmetry around its mean. As with kurtosis, a skewness value of ±1.0 is considered excellent, but a value of ±2.0 is also considered acceptable. Table 4.5 presents the kurtosis and skewness of the manipulation check item both the PG group and the UPG group. The result shows no normality problem has been found in the manipulation check data.

Table 4.5 Descriptive statistics for the manipulation-check data.

Group	N	Mean	Std. Dev.	Normality		
				Test	Statistics	Std. Error
PG	117	3.77	2.010	Skewness	0.375	0.224
				Kurtosis	-1.133	0.444
UPG	118	4.56	1.865	Skewness	-0.324	0.223
				Kurtosis	-0.979	0.442

The Levene's test (see Table 4.6) shows that no homogeneity problem was found in the manipulation check data (F = 0.806, Sig. = 0.370). After confirming that no normality and no homogeneity problems were found, the t-test was conducted. The result of the t-test (see Table 4.6) shows that the mean of the manipulation check item in the PG group and in the UPG group was significantly different with t = -3.123 and p = 0.002 (2-tailed). The above results show that the new manipulation check item was able to separate the PG group from the UPG group. As such, the data obtained from the experiment were useful for the subsequent analyses.

Table 4.6 The result of t-test on manipulation check item.

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	**0.806**	**0.370**	**-3.123**	**233**	**0.002**	**-0.790**	**0.253**
Equal variances not assumed			-3.122	231.397	0.002	-0.790	0.253

4.3.3.4 ***Descriptive Statistics***

Table 4.7 shows the descriptive statistics for the reflective variables. As stated earlier, items for manipulation check used in the real experiment is only one item. As such, the Cronbach's alpha score for this item is not stated in Table 4.7. From the Cronbach's alpha scores, it can be observed that all variables satisfy Nunnally's (1978) reliability criterion of being greater than 0.7. As such, all data for these variables were useful for assessing the hypotheses.

Table 4.7 Descriptive statistics from the real experiment (N = 235).

Variable	**Statistics**		
	Cronbach's Alpha	**Means**	**St. Dev.**
User Internet Experience	0.884	5.240	1.012
User Involvement	0.889	4.397	1.045
Attitude toward Online Purchase	0.905	4.582	0.988
User Satisfaction	0.889	4.673	1.169
Online Purchase Intention	0.926	3.778	1.437

4.4.3.5 ***Multicollinearity Check for the Formative Indicators***

As with the result of the pilot study, multicollinearity check was also conducted to test whether multicollinearity problem in both the formative indicators (perceived Web search benefit and perceived Web search cost) exists. Table E.5 and Table E.6 show that no indicator in either perceived Web search benefit or perceived Web search cost has its tolerance value of < 0.1 or VIF > 10. As such, the data show that there is no multicollinearity problem in both perceived Web search benefit and perceived Web search cost. As such, no item from these two formative variables was dropped in the subsequent analysis.

Chapter 5

DATA ANALYSIS

This chapter reports the results of the statistical analysis performed on the post-experiment data. The statistical analysis proceeds as follow. It starts with an assessment of whether different Web search strategies lead to different perceived Web search benefits and perceived Web search costs. However, the normality test of the data obtained from both the PG group and the UPG group must be done preceding the above assessment. The normality test is needed to make sure that the data from these groups have a normal distribution (Weinberg and Abramowitz 2002). It is, then, followed by the t-test to do the above assessment.

Data analysis continues by assessing the research model using PLS (Fornell and Larcker 1981; Barclay et al. 1995; Chin et al. 2003; Chin 1998a; Chin 1998b; Gefen et al. 2000). Assessing a research model using PLS involves two steps: measurement model and structural model. Measurement model assessment comprises convergent validity and discriminant validity. Structural model assessment comprises path significance and explanatory power of the model that can be obtained by calculating the R^2 of all endogenous variables. In order to assess both the measurement model and the structural model, several calculations are needed to obtain item reliability (item loading), internal consistency or construct reliability, cross loading, the Average Variance Extracted (AVE), path coefficients and their significances, as well as R^2. However, PLS does not provide internal consistency, cross loading, and AVE automatically. As such, SPSS was used to calculate these scores.

As the research model proposed a moderating effect of user Internet experience (UIE) on the relationship between Web search strategies and perceived Web search benefit and perceived Web search cost, the analysis of the moderating effect follows. The data analysis continues to compare the strength of the relationships among latent variables in both the PG group and the UPG group. At the end of this chapter, the outcome of the statistical analysis undertaken to test the research hypotheses is given. This part highlights the significant effects of independent variables on dependent variables, the significance of the hypothesized relationships among variables and their strength. It also highlights the strength of the moderation effect.

5.1 Comparing the Seekers' Perceived Web Search Benefit and Web Search Cost

Hypotheses H1 and H2 compare whether seekers in the PG group perceive Web search benefit (PWSB) and Web search cost (PWSC) differently from those in the UPG group. Table E.7 presents the mean and standard deviation scores of PWSB and PWSC for both the PG group and the UPG group. To assess hypotheses H1 and H2, the mean of the above variables from different groups must be compared. To compare means between two samples using t-test, two conditions must be satisfied: a) both samples are normally distributed, and b) both samples have equal variance (Weinberg and Abramowitz 2002).

The normality of the data can be observed by assessing the sample's skewness and its kurtosis (George and Mallery 2003). Table E.7 presents the normality check for PWSB and PWSC based on their skewness and kurtosis. This table shows that both skewness and kurtosis of PWSB and PWSC in both groups are satisfactory, that is ***abs***(skewness) ≤ 1, and ***abs***(kurtosis) ≤ 1, where ***abs*** stands for absolute value.

Table E.8 presents the Levene's test and the t-test results for these two variables. This table shows that the Levene's test on PWSB and PWSC yields p = 0.567 and 0.272, respectively. Since it is assumed that α = 0.05, this result suggests that the respondents' data for both groups have met the variances homogeneity requirement.

As the normality and the homogeneity requirements were satisfactory, the t-test that was conducted subsequently revealed that the t-value for PWSB is t = -1.933 (p = 0.027, one-tailed) (see Table E.8). Subsequently, the t-value for PWSC is t = 2.017 (p = 0.023, (one-tailed). These results show that hypotheses H1 and H2 were supported by the data.

5.2 Data Analysis Using PLS

Data analysis and hypothesis testing for the structural model as depicted in Figure 3.1 were conducted using PLS-Graph. PLS does not only allow researchers to develop a model that contain reflective or formative indicators alone, but it also allows them to have a model that contain a combination of both types of indicators (Chin 1998a). Since this study proposes a model that contains both reflective and formative indicators (i.e. perceived Web search benefit and perceived Web search cost), PLS was used for data analysis and hypotheses testing. Gefen et al. (2000) stated that PLS is "designed to explain variance, i.e., to examine the significance of the relationships and their resulting R^2, as in linear regression" (p. 27). Besides, PLS offers several advantages over other structural analysis methods, e.g. LISREL, to the extent that:

- it emphasizes prediction and aims at high prediction accuracy (Wold 1982);

- PLS does not require the raw data to have identical distributions (Fornell and Cha 1994). In other words, it uses a distribution-free approach (Barclay et al. 1995);
- it can handle small sample size[(1)] (Fornell et al. 1982) with complex causal model (Barclay et al. 1995);
- it works to maximize the variance explained in constructs and/or variables rather than the overall model fit (Barclay et al. 1995);
- "it is generally recommended for predictive research models where the emphasis may be on the theory development" (Barclay et al. 1995, p. 288).

As already mentioned, hypothesis testing using PLS is conducted in two steps (e.g. Barclay et al. 1995). The first step is to assess the measurement model describing the relationship between latent variables and their corresponding manifest (indicator) variables. Reflective variables are variables typically viewed "as underlying factors that give rise to something that is observed" (Fornell and Cha 1994, p. 61), e.g. "attitude" or "user satisfaction." Bagozzi (1994) stated that

> "Each reflective indicator of a theoretical variable should be regarded as a measurement of either the properties of that theoretical variable or the implications that the theoretical variable has in terms of its observable manifestations …… reflective indicators provide a way to test hypotheses about the properties (e.g. reliability, single factoredness) and construct validity of measures" (p. 331-332).

Chin (1998a) stated that, "loadings should be inspected for determining the appropriateness of the indicators" (p. 306). Low loadings imply little relationship between indicators and its corresponding latent variable in term of shared variance.

[(1)] The discussion about sample size can be found in Chin's Website: http://disc-nt.cba.uh. edu/chin/plsfaq/plsfaq.htm.

The second step, after confirming that the measurement model is adequate, is to assess the structural model showing the relationship among latent variables. This sequence ensures that researchers will not draw a conclusion on the relationship of the research constructs as depicted on their research model before they make sure that they have valid and reliable measures. The combination of measurement model and structural model enables "measurement errors of the observed variables to be analyzed as an integral part of the model, and factor analysis to be combined in one operation with hypotheses testing" (Gefen et al. 2000, p. 5).

For formative indicators, the use of loading is misleading because "the intraset correlations for each block were taken into account in the estimation process" (Chin 1998a, p. 307). Instead, indicators' weights are used. Indicators' weights provide information about the relative importance of these indicators toward the creation/formation of the corresponding latent constructs. As such, the data analysis presented in the subsequent sections is for reflective indicators only.

5.2.1 PLS Estimation Model

This study considers user Internet experience (UIE) to moderate the relationship between Web search strategy (WSS) and perceived Web search benefit (PWSB) as well as perceived Web search cost (PWSC). Chin et al. (2003) show a method on how to deal with a moderating model using PLS. It is a two-step technique. The first step is to estimate the main model, that is, the model without the interaction terms. From this step, we will obtain the first R^2, namely $R_{sq\text{-}main}$. The second step is to multiply the main latent construct and the moderating construct and insert the result to the model as the interaction term. From this interaction model we

will obtain the second R^2, namely $R_{sq\text{-}interaction}$. Based on these two values, the strength of the moderation effect can be evaluated.

Figure 5.1.depicts the research model, and its equivalent, that was used for the PLS calculations. However, they only show the latent variables that are directly affected by the moderating variable. Figure 5.1.a depicts the main model, i.e. the model with no moderating variable that can directly be estimated by PLS. Figure 5.1.b depicts the model with UIE as the moderating variable; thus, it is called the interaction model.

In order to have a true interaction effect, main effect variables should be included in the analysis (Jaccard et al. 1990). As such, for assessing the moderation effect, the model for PLS estimation for the interaction model as depicted in Figure 5.1.c will be used (Chin et al. 2003). The complete diagram showing all the latent variables along with their respective indicators is presented in Figure C.1 and Figure C.2 (see Appendix C).

5.2.2 Preparing Data for Analysis

As depicted in Appendix C, perceived Web search benefit (PWSB) and perceived Web search cost (PWSC) are both formative endogenous variables. All other variables are reflective endogenous variables, except Web search strategy (WSS) and user Internet experience (UIE), which is reflective exogenous variable, and moderating variable, respectively.

User involvement (UINV) is measured using 7-point semantic differential scale items, in which "1" and "7" points to the different extreme sides of the scale, e.g. extremely essential and extremely foolish, respectively (i.e. from positive to negative). As such, the data need to be reversed before they were used in the PLS

estimation. This reversion is needed to have the data from all variables in the same directions (i.e. from negative to positive).

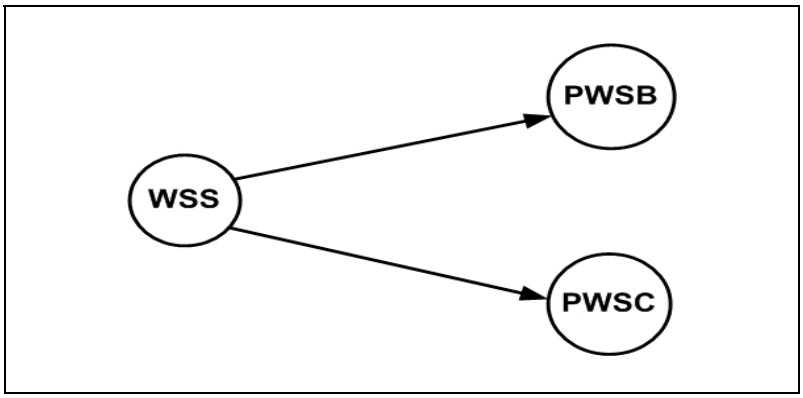

Figure 5.1.a. The main model.

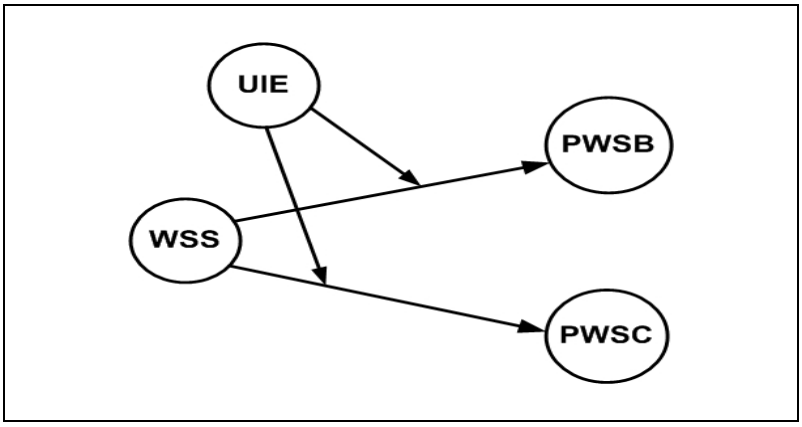

Figure 5.1.b. The interaction model.

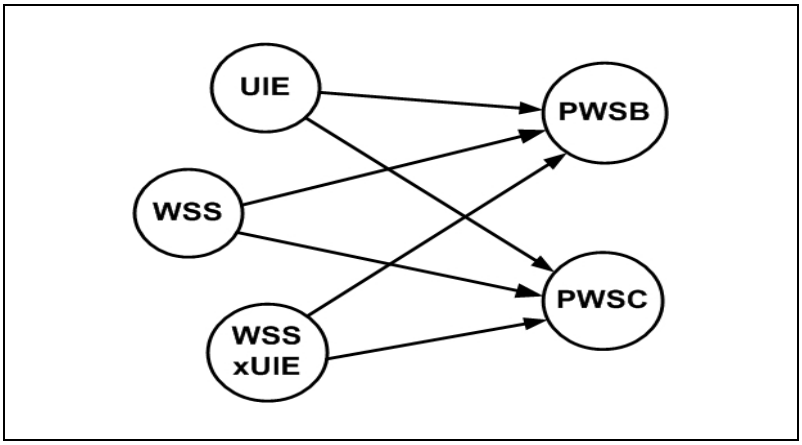

Figure 5.1.c. Model of the PLS estimation for the interaction model.

To estimate the moderating (or interaction) effect, all related indicators must be in standardized[(2)] or centered[(3)] form (Chin et al. 2003). Standardized or centered indicators are used to lower the correlation between the product indicators and their individual components. It helps to avoid computational errors (Smith and Sasaki 1979 (in Chin et al. 2003)). For this study, all data items in WSS (main predictor) and UIE (moderating variable) need to be standardized. After standardizing, or centering, these data, any product indicator of the main predictor and the moderating variable, expressed as $WSS_i * UIE_i$, would represent the underlying latent interaction variable WSS∗UIE (Chin et al. 2003). In Figure 5.1.c, the interaction variable is labeled as WSSxUIE.

5.3 PLS Estimation: The Measurement Model

The assessment of the measurement model concerns with the construct validity, or "the extent to which the manifest indicators reflect their underlying constructs" (Hanlon 2001). This construct validity includes the assessment of convergent validity and discriminant validity. All the necessary tests to assess the measurement model of all the four models are presented in the following subsections.

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(2) Standardized data are the data with its mean = 0 and its standard deviation = 1. According to Chin et al. (2003), the standardized data can be calculated using this formula: $stdata_i = (rawdata_i - mean)/stdev$ where $stdata_i$ is the i^{th} standardized data, $rawdata_i$ is the i^{th} respondent's data, *mean* is the mean of all respondents' data for the same indicator, and *stdev* is standard deviation.

(3) Centered data are the data in which its average = 0. The centered data can be calculated by using this formula: $ctrdata_i = rawdata_i - mean$, where $ctrdata_i$ is the i^{th} centered data, $rawdata_i$ is the i^{th} respondent's data, *mean* is the mean of all respondents' data for the same indicator.

5.3.1 Convergent Validity

Convergent validity consists of individual item reliability and its internal consistency[4] (or construct reliability). Item reliability is assessed by examining item's loading to their corresponding latent variable. Barclay et al. (1995) suggested a rule of thumb in assessing items' reliability that items with minimal loadings of 0.707 ($\lambda \geq 0.707$) are judged adequate. From the fact that the loadings are actually correlations, the loading of minimal 0.707 implies that more than 50% of variance in the observed item is shared with its corresponding latent construct. Table E.9.a and Table E.9.b show item reliability scores for all indicators.

Chin (1998a) stated that item's loading of less than 0.707 but greater than 0.6 is acceptable provided that there are other indicators in the same block for comparison basis. Hanlon (2001), and Rivard and Huff (1988) have also suggested that item loading that is greater than 0.5 are acceptable provided that those items were newly developed. Table E.9.a and Table E.9.b show that all items loading are equal or greater then the suggested score. As such, all items in all latent variables were used in the subsequent analysis.

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[4] Internal consistency is "the degree of correspondence between theoretical constructs and their measures," (Fornell et al. 1982, p. 405). PLS does not give internal consistency score directly. However, Fornell and Larcker (1981) (see also Barclay et al. 1995) have developed a formula to compute an internal consistency score as shown in equation:

$$\text{Internal consistency} = \frac{(\Sigma \lambda_i)^2}{(\Sigma \lambda_i)^2 + \Sigma \text{Var}(\varepsilon_i)} = \frac{(\Sigma \lambda_i)^2}{(\Sigma \lambda_i)^2 + \Sigma (1 - \lambda_i^2)}$$

where λ_i is the loading of manifest variable *i* to its corresponding variable, and $\text{Var}(\varepsilon_i)$ is the error term of manifest variable *i*. Both loading and its corresponding standard error for manifest variable *i* can be obtained directly from the PLS output by running a bootstrap or jackknife sampling, then look for output file BOOT.pls or JACK.pls, respectively. BOOT.pls or JACK.pls is the default file name.

The second test to evaluate the convergent validity is done by observing the internal consistency or construct reliability (ρ_ξ for exogenous variable, or ρ_η for endogenous variable). Table E.9.a and Table E.9.b present the internal consistency for all latent variables in the main model and in the interaction model, respectively.

The Internal consistency measure proposed by Fornell and Larcker (1981) is similar to Cronbach's alpha (Cronbach et al. 1972), except that the latter presumes that "each indicator of a construct contribute equally (i.e. the loadings are set equal to unity)" (Barclay et al. 1995, p. 297). Carmines and Zeller (1979) stated that the reliability score could never be lower than Cronbach's alpha that is "alpha provides a conservative estimate of a measure's reliability" (p.45). However, their interpretations are similar. Nunnally (1978) suggested that internal consistency score should be at least 0.70. Fornell and Larcker (1981) suggested differently: they defined 0.50 as a minimal internal consistency score. For widely used scales, Carmines and Zeller (1979) gave more demanding rule of thumb that the reliability should not be below 0.80.

Table E.9.a and Table E.9.b show the internal consistency scores calculated by using Fornell and Larcker (1981) formula (see footnote (4)). The internal consistency scores presented in these tables both satisfy Nunnally (1978) as well as Fornell and Larcker (1981) criterion, even Carmines and Zeller (1979).

5.3.2 Discriminant Validity

Discriminant validity is also conducted for both the indicator level and the variable level. For the indicator level, Barclay et al. (1995) stated that no manifest variable should load higher on other variables than on the variable it intends to

measure. In other word, item cross loading[5] to other variables must be lower than item loading to its corresponding variable.

Table E.10.a presents loading and cross loading matrix of all items to its corresponding variable and all other variables of the main model. Table E.10.b presents the same information for the interaction model. From these two tables, it can be observed that all manifest variables load higher on its corresponding latent variable than on the other latent variables. Thus, discriminant validity at the indicator level is adequate.

At the construct level, discriminant validity is assessed by comparing a square root of the Average Variance Extracted (AVE)[6] of one particular variable with the correlation of that variable with all other variables. Fornell and Larcker (1981) stated that AVE should be at least 0.5, or its square root is about 0.707, which means that variance due to measurement error is smaller than the variance captured by the construct. It is also stated that to fully satisfy the discriminant validity, square root of

[5] PLS-Graph does not provide items' cross loading directly. However, this can be calculated quite easily by employing bivariate correlation using SPPS (e.g. Green et al. 1997) between the latent scores from PLS output and the standardized respondents' data.

[6] AVE is the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error (Fornell and Larcker, 1981). As with cross loading, PLS does not calculate AVE automatically, either. However, AVE can be calculated by using the following equation (Fornell and Larcker 1981, Barclay et al. 1995; Gefen et al, 2000):

$$AVE = \frac{\Sigma \lambda_i^2}{\Sigma \lambda_i^2 + \Sigma \mathrm{Var}(\varepsilon_i)} = \frac{\Sigma \lambda_i^2}{\Sigma \lambda_i^2 + \Sigma (1 - \lambda_i^2)}$$

where *AVE* is the Average Variance Extracted for either exogenous or endogenous constructs is the loading score of indicator *i* to its corresponding construct. If "Unit variance" option on the PLS-Graph had been selected, the above AVE formula is simplified to become $\Sigma \lambda_i^2 / n$, where *n* is the number of indicator in the latent variable.

AVE of one variable must be greater than the correlation between that variable with all other variables.

Table E.11.a presents the comparison of square rooted AVE of each latent variable, written as diagonal elements, with their correlation to the other latent variables for the main model. Table E.11.b presents the same information for the interaction model. Table E.11.a and Table E.11.b show that square rooted AVE scores for all variables satisfy Fornell and Larcker (1981) criterion, which is at least 0.707, as well as that all square rooted AVE scores for every variable is greater than the correlation between that variable to all other variables.

Judging from the above results, we conclude that the discriminant validity at the construct level for all latent variables is adequate. As such, the measurement model assessments for both the main model and the interaction model are deemed satisfactory.

5.4 PLS Estimation: The Structural Model

The structural model comprises the assessment of the hypothesized relationship among latent variables in the research model, that is, the path coefficients, which are standardized β. Table 5.1.a and Table 5.1.b show the coefficient[7] of each hypothesized path and its corresponding t-value obtained from 300-sample bootstrap[8] for both models.

Chin (1998a) stated that path coefficients should be at least 0.20 and ideally greater than 0.30 in order for the relationship to be considered meaningful. Table

[7] In PLS-Graph, path coefficients and their corresponding t-values can be obtained by using bootstrap or jackknife sampling. With these values, we can assess statistical conclusion validity by testing the null hypothesis for each path coefficient.

[8] According to Bartholomew (1987), a bootstrap with 300-sample will give a more stable result.

5.1.b shows that although the first four relationships are not significant, however, because two interaction relationships are significant, WSSxUIE → PWSB (β = 0.169, t = 2.140, p < 0.05) and WSSxUIE → PWSC (β = -0.228, t = -2.358, p < 0.05), therefore we can ignore the first four not significant relationships (e.g. Devore 2000).

Table 5.1.a Path coefficients for the main model.

Path			Path Coefficient	t-value	Significance (2-tailed)
From		To			
WSS	→	PWSB	0.091	1.154	ns#
WSS	→	PWSC	-0.187	-2.312	p < 0.05
PWSB	→	UINV	0.439	6.653	p < 0.001
PWSC	→	UINV	-0.190	-2.755	p < 0.01
UINV	→	ATOP	0.519	10.338	p < 0.001
UINV	→	USAT	0.467	7.153	p < 0.001
UINV	→	OPI	0.075	1.190	ns#
ATOP	→	OPI	0.450	7.489	p < 0.001
USAT	→	OPI	0.248	3.815	p < 0.001

ns: not significant

Table 5.1.b Path coefficients for the interaction model.

Path			Path Coefficient	t-value	Significance (2-tailed)
From		To			
WSS	→	PWSB	0.086	1.021	ns#
WSS	→	PWSC	-0.166	-1.922	p < 0.1
UIE	→	PWSB	0.104	0.791	ns#
UIE	→	PWSC	-0.158	-0.978	ns#
WSSxUIE	→	PWSB	0.169	2.140	p < 0.05
WSSxUIE	→	PWSC	-0.228	-2.358	p < 0.05
PWSB	→	UINV	0.445	5.301	p < 0.001
PWSC	→	UINV	-0.159	-1.709	p < 0.1
UINV	→	ATOP	0.519	9.657	p < 0.001
UINV	→	USAT	0.467	7.232	p < 0.001
UINV	→	OPI	0.075	1.092	ns#
ATOP	→	OPI	0.450	8.126	p < 0.001
USAT	→	OPI	0.248	3.366	p < 0.01

#ns: not significant

Table 5.1.b also shows that the relationship between user involvement and online purchase intention (UINV → OPI) is not significant (β = 0.075, t = 1.092). The relationship between perceived Web search cost and user involvement (PWSC → UINV) is marginally significant (β = -0.159, t = -1.709, p < 0.1) (George and Mallery 2003). The other relationships are significant at the 0.01 level or better.

The explanatory power of the model can be assessed by observing the R^2 of all the endogenous variables. The value of R^2 indicates the "amount of variance of the construct which is explained by the model" (Barclay et al. 1995, p. 299). It is an indicator of how well the model fits the data (Weinberg and Abramowitz, 2002).

The values of R^2 obtained from the PLS are interpreted in the same manner as R^2 obtained from multiple regression. Thus, their significance can also be evaluated by the traditional F-test with 1 and *n*-2 degree of freedom (Fornell and Larcker, 1981). Table 5.2 presents the R^2 for all endogenous variables in both models.

Table 5.2 R^2 for the endogenous variables.

Endogenous Construct	R^2 (Main Model)	R^2 (Interaction Model)
Perceived Web search benefit (PWSB)	0.008	0.044
Perceived Web search cost (PWSC)	0.035	0.100
User Involvement (UINV)	0.309	0.296
Attitude toward Online Purchase (ATOP)	0.269	0.269
User Satisfaction (USAT)	0.218	0.218
Online Purchase Intention (OPI)	0.431	0.431

Cohen (1988) (see also Weinberg and Abramowitz 2002) shows how to assess the effect size of R^2. The R^2 value of 0.01, 0.09, 0.25, is said to have a small, medium, and large effect, respectively. Table 5.2 shows the effect of exogenous variables

and/or endogenous variable on other endogenous variables. Based on Cohen (1988), within the main model, Web search strategy in the main model has a small effect on both perceived Web search benefit and perceived Web search cost. On the interaction model, although there is an increase in R^2 for perceived Web search benefit and perceived Web search cost, these new R^2 are still considered small. All other endogenous variables have strong effects on other endogenous variables.

5.5 Assessment of the Moderation Effect

Table 5.2 shows that with the presence of user Internet experience as a moderating factor between Web search strategy and perceived Web search benefit, as well as perceived Web search cost, there was an improvement in R^2. The R^2 of perceived Web search benefit and perceived Web search cost has increased from 0.008 and 0.035, respectively, to 0.044 and 0.100, respectively. However, these improvements need to be evaluated further to observe their strength.

The moderation effect size can be assessed by first calculating the f^2 [(9)] value. Table 5.3 presents the change in R^2 from the main model to the moderated model and its moderation effect size.

Cross checking with the SPSS version 12, Table E.12.a shows the significance of R^2 change between the main model and the moderated model with the presence of user Internet experience as a moderating factor influencing the relationship between

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(9) The moderation effect size, f^2, can be calculated by using the following equation (Cohen 1988, Chin et al. 2003).

$$f^2 = \frac{R^2_{interaction} - R^2_{mainmodel}}{1 - R^2_{interaction}}$$

where R^2_{main} is the R^2 in the main model, and $R^2_{interaction}$ is the R^2 in the interaction model. The moderation effect size is considered small, medium, or large if the value of f^2 is above 0.02, 0.15, or 0.35, respectively (Cohen, 1988).

Web search strategy and perceived Web search benefit. In this table, Model 1 means PWSB is regressed on WSS, and Model 2 means PWSB is regressed on WSS, UIE, and WSS*UIE. It can be seen from this table that the changing in R^2 from the main model to the moderated model is significant at $p = 0.018$.

Table 5.3 The moderation effect size.

Latent Construct	R^2 (main model)	R^2 (interaction model)	f^2
Perceived Web search benefit (PWSB)	0.008	0.044	0.038
Perceived Web search cost (PWSC)	0.035	0.100	0.072

Table E.12.b shows the significance of R^2 change on perceived Web search cost crosschecked with SPSS. In this table, Model 1 means PWSC is regressed on WSS, and Model 2 means PWSC is regressed on WSS, UIE, and WSS*UIE. It can be seen from this table that the changing in R^2 from the main model to the moderated model is significant at $p = 0.011$.

To sumarize the result of the above data analysis, Figure 5.2.a and 5.2.b present the structural model of the main model and the interaction model, respectively. Dashed lines (---) show the not significant relationships. Dot-dash-dot line (.-.) presents a marginally significant relationship, that is $p < 0.1$ (George and Mallery 2003).

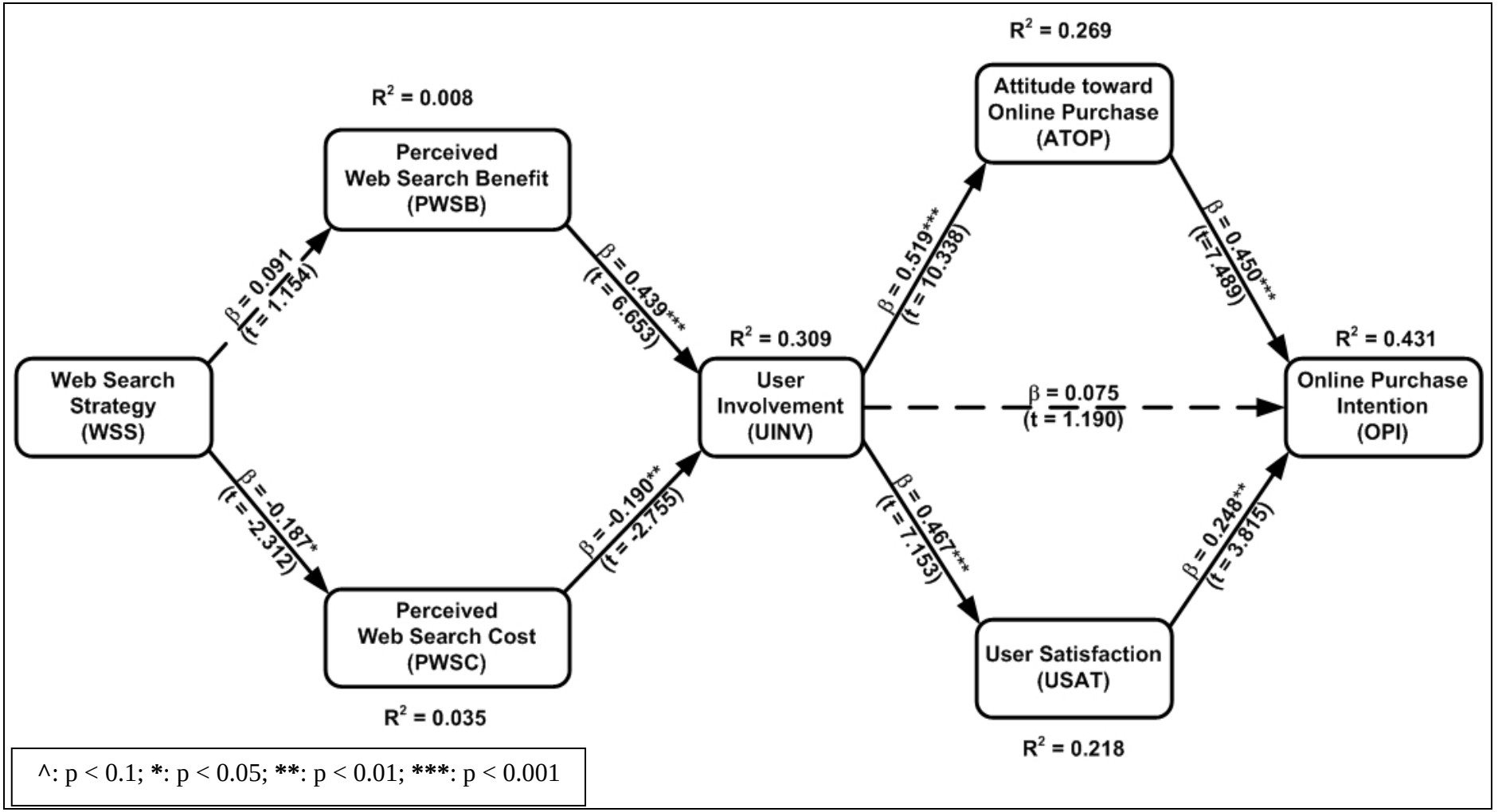

Figure 5.2.a Structural model of the main model.

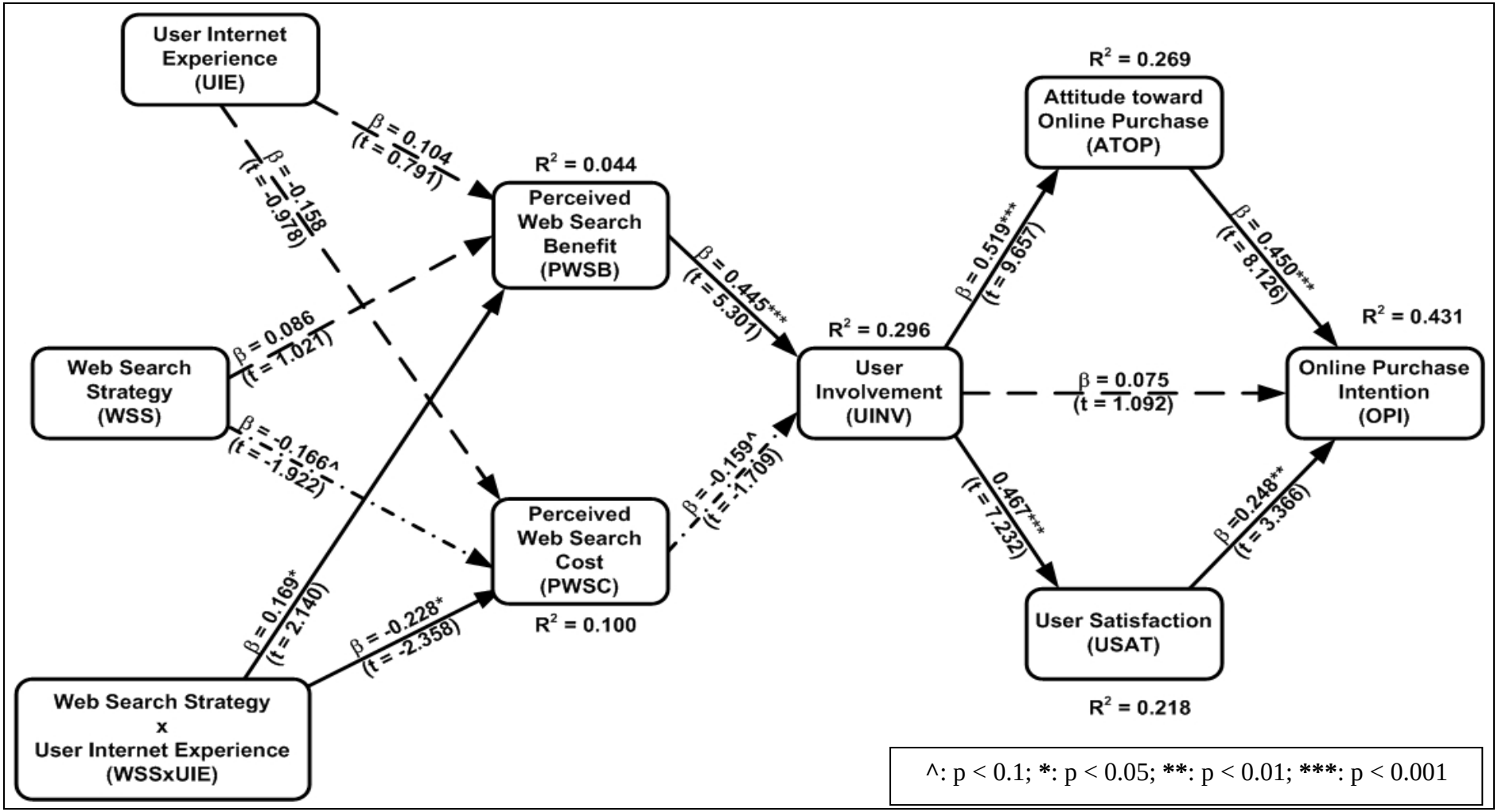

Figure 5.2.b Structural model of the interaction model.

5.6 Comparison of the Planned Group and the Unplanned Group

Hypothesis H3a and H4a hypothesize whether positive effect of perceived Web search benefit on user involvement, and negative effect of perceived Web search cost on user involvement, respectively, is different among different seekers groups. This sounds like calculating the interaction effect of Web search strategy and perceived Web search benefit, and Web search strategy and perceived Web search cost, toward user involvement. According to Chin et al. (2003), interaction model must be calculated with the procedure that has been explained above. However, since Web search strategy is a reflective variable while perceived Web search benefit and perceived Web search cost are formative variables, the above procedure cannot be used. There is no literature on how to deal with this situation. Therefore, the following method is applied. The same PLS estimation is applied for both the PG group and the UPG group, then, the path coefficients in two different groups are compared. By using this method, a deeper look of the difference between these two groups can be investigated further.

5.6.1 PLS Estimation

As with the above analysis, PLS was also used to compare data from the PG group and the UPG group. For this comparison, WSS was taken out, so that both PWSB and PWSC were assumed as independent variables for the PLS calculation. The comparison was made for the whole dataset (Combined Dataset), dataset from the PG group, and dataset from the UPG group.

Table E.13 presents the result of the convergent validity test for the above three datasets. Values inside parenthesis under the column heading “Internal Consistency” represent Cronbach’s alpha scores for comparison purpose. From this

table it can be observed that the reliability of all items in both the PG group and the UPG group were satisfactory, although some of them are less than 0.7 but greater than 0.6. This value is acceptable because there are other indicators in the same latent construct (Chin 1998a). Internal consistency for every latent variable in all datasets was satisfactory as well. As to follow Carmines and Zeller (1979), all construct reliability scores were higher than their corresponding Cronbach's alpha score (written inside the parenthesis).

Table E.14 shows loading and cross loading for all datasets. It can be observed that all items load higher on their corresponding latent construct than on all other constructs. Table E.15 shows the comparison of the square-rooted AVE for each latent variable with its correlation to all other latent variables. This table shows the evidence that the square-rooted AVE for each latent variable was higher than its correlation to all other variables. As such, the discriminant validity for all datasets was satisfactory. Since both the convergent validity and the discriminant validity were satisfactory in each dataset, therefore each dataset showed an adequate measurement model.

To show the adequacy of the structural model for all datasets, Table 5.4 shows the path coefficients and their corresponding t-value. This table shows that for the PG group, the relationships between user involvement and online purchase intention (UINV → OPI) and between user satisfaction and online purchase intention (USAT → OPI) were both not significant. In the UPG group, there was only one not significant path, i.e. between user involvement and online purchase intention (UINV → OPI).

The explanatory power for each dataset can be observed from Table 5.5. Based on the Cohen's (1988) effect size criterion, the R^2 of online purchase intention

for both groups, were different. However, these R^2 values show that the combination of all exogenous and/or all endogenous latent variables, except user involvement, has a strong effect on online purchase intention.

Table 5.4 Path coefficients and their corresponding t-values for different datasets

Path		Combined Dataset			Dataset from the PG Group			Dataset from the UPG Group		
From	**To**	**β**	**t**	**$Sig**	**β**	**t**	**$Sig**	**β**	**T**	**$Sig**
PWSB →	UINV	0.437	6.567	***	0.379	4.911	***	0.476	5.153	***
PWSC →	UINV	-0.200	-3.032	**	-0.226	-3.141	**	-0.232	-2.653	**
UINV →	ATOP	0.519	9.622	***	0.420	4.933	***	0.596	10.047	***
UINV →	USAT	0.467	7.176	***	0.527	7.589	***	0.388	3.474	***
UINV →	OPI	0.075	1.095	ns#	0.136	1.713	ns#	0.065	0.556	ns#
ATOP →	OPI	0.450	8.160	***	0.539	7.332	***	0.368	3.733	***
USAT →	OPI	0.248	3.377	***	0.152	1.872	ns#	0.304	3.248	**

$: 2-tailed, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, #ns: not significant

Table 5.5 R^2 for all endogenous variables for different datasets.

Dataset	UINV	ATOP	USAT	OPI
Combined Dataset	0.313	0.269	0.218	0.431
From the PG group	0.273	0.176	0.278	0.504
From the UPG group	0.395	0.355	0.150	0.368

Figure 5.3 shows the structural model for all datasets. Figure 5.3.b and Figure 5.3.c show that all relationships, except one relationship between user satisfaction and online purchase intention (USAT → OPI), are consistent in both the PG group and the UPG group. User involvement consistently has no effect on online purchase intention (UINV → OPI) in both groups, while all others are consistently significant. On the other hand, the effect of user satisfaction on online purchase intention (USAT → OPI) is sensitive upon the seekers' strategy; in the PG group no significant relationship is demonstrated, while in the UPG group this relationship is significantly supported.

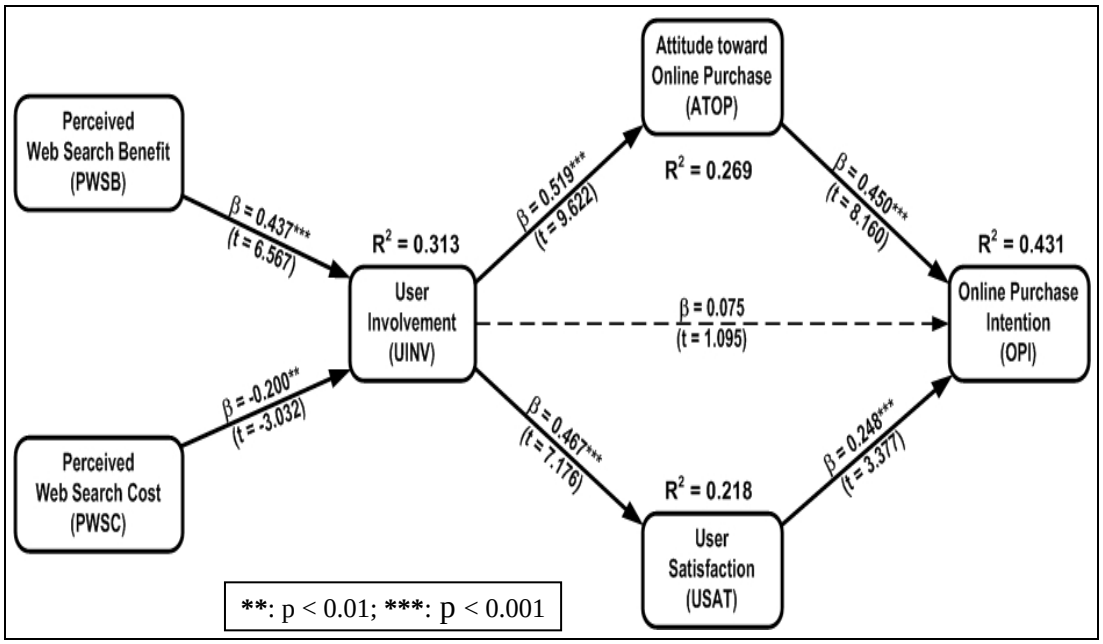

Figure 5.3.a Structural model for the Combined Dataset.

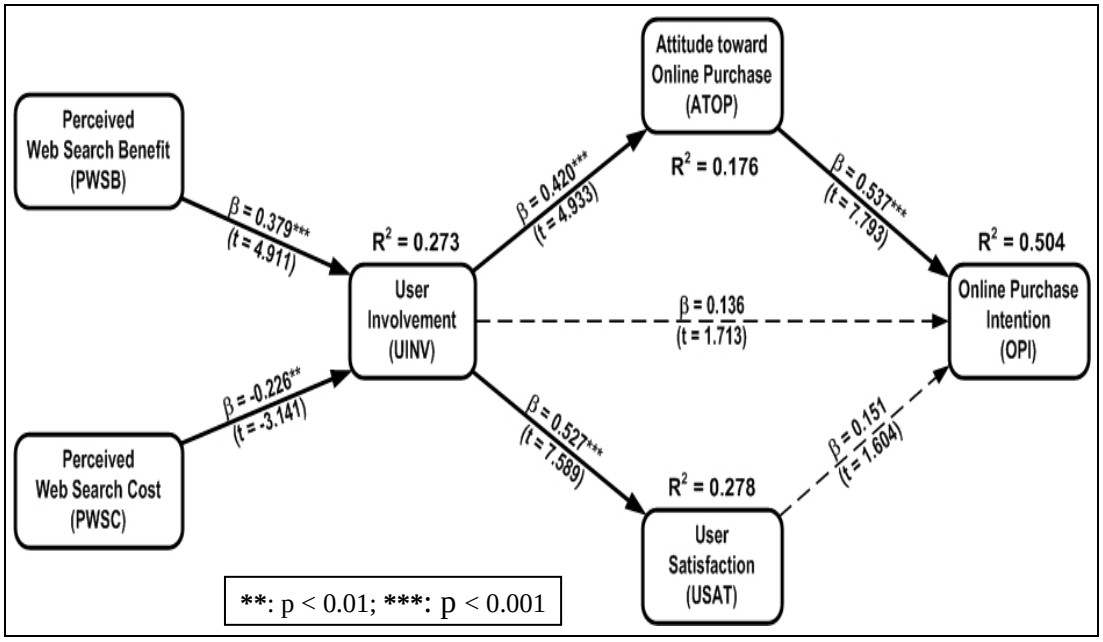

Figure 5.3.b Structural model for the planned group (PG).

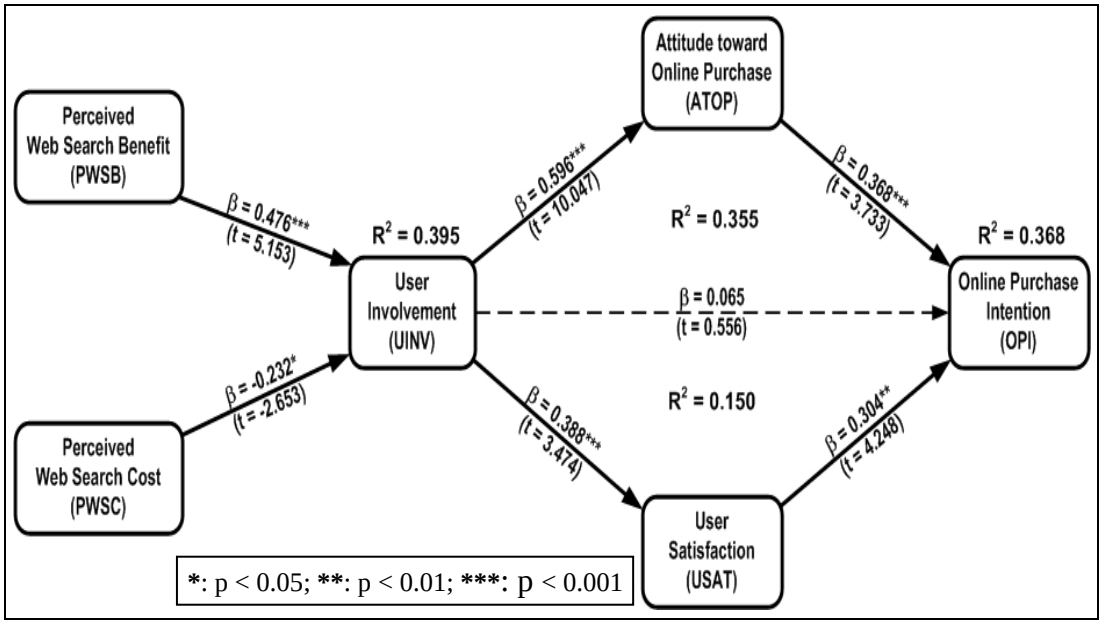

Figure 5.3.c Structural model for the unplanned group (UPG).

5.6.2 Path Comparison

In order to compare the strength of the effect of one latent variable on the other variables between the two groups, a path comparison is needed. The statistical comparison can be done using the following procedure (Keil et al. 2000):

$$S_{pooled} = \sqrt{[(N_1 - 1)/(N_1 + N_2 - 2)] * SE_1^2 + [(N_2 - 1)/(N_1 + N_2 - 2)] * SE_2^2} \quad 5.1)$$

$$t = (PC_1 - PC_2)/(S_{pooled} * \sqrt{1/N_1 + 1/N_2}) \quad 5.2)$$

where S_{pooled} = pooled estimator for variance

t = t-statistic with $(N_1 + N_2 - 2)$ degrees of freedom

SE_i = standard error of path in the structural model of group i

PC_i = path coefficient in the structural model of group i.

N_i = number of respondents of group i.

The result of the path comparison is presented in Table 5.6. This table neither compares the relationship between user satisfaction and online purchase intention

(USAT → OPI) nor between user involvement and online purchase intention (UINV → OPI) in both groups, because the relationships either not significant in both groups or not significant in one group but significant in the other group.

Table 5.6 The result of the path comparisons between the PG group and the UPG group

Group	PWSB→UINV	PWSC→UINV	UINV→ATOP	UINV→USAT	ATOP→OPI
PG	β = 0.379	β = -0.226	β = 0.420	β = 0.527	β = 0.539
	SE = 0.077	SE = 0.072	SE = 0.085	SE = 0.069	SE = 0.074
	N = 117	N = 117	N = 117	N = 117	N = 117
UPG	β = 0.476	β = -0.232	β = 0.596	β = 0.388	β = 0.368
	SE = 0.092	SE = 0.088	SE = 0.112	SE = 0.116	SE = 0.099
	N = 118	N = 118	N = 118	N = 118	N = 118
Result	**t = -8.761**	t = 0.572	**t = -13.561**	**t = 11.152**	**t = 14.987**
	p < 0.001	Not sig.	**p < 0.001**	**p < 0.001**	**p < 0.001**

5.7 The Formative Indicators' Weight

Previous subsections present the result of the PLS estimation for the reflective indicators. For formative indicators such a data analysis is misleading (Chin 1998a). There is very limited literature on how formative indicators should be handled and presented. Chin (1998a) gave a formal specification on how PLS handles formative indicators. However, the result showed only the weight of the formative indicators. To follow this step, Table E.16 presents the weight of the formative indicators used in this study, i.e. online benefit and online cost.

Although there are several non-significant items in terms of their weight, "the inclusion of non-significant formative measures should not affect the estimates and any reanalysis after dropping non-significant items is not required. Because PLS is based on standard ordinary least squares regression, misspecification due to the inclusion of 'irrelevant' items will not bias the estimates of significant items."

(Mathieson et al. 2001, p. 107). Furthermore, the only problem with the "irrelevant" items is when these items have a high multicollinearity. However, Table E.5 and Table E.6 show that no multicollinearity problem in both the formative indicators, i.e. PWSB and PWSC, was found.

5.8 Result of Hypotheses Test

This section summarizes the result of hypothesis testing as described above. It highlights the significant, as well as the not significant, hypothesized relationships.

5.8.1 Web Search Strategy

Subsection 5.1 presents the data analysis to assess whether different Web search strategies lead to different perceived Web search benefit and perceived Web search cost. Table E.8 shows the t-test result for perceived Web search benefit, i.e. the mean difference = -0.217, t = -1.933 and p = 0.027 (one-tailed). When the t-test was run, data from the PG group was put as the first factor, and data from the UPG group was put as the second factor. Minus sign in the mean difference, i.e. -0.217, shows that the data from the PG group have smaller mean value compared to the data from the UPG group. We assume that $\alpha = 0.05$. This means that the mean value of the PG group's data is significantly less than the mean value of the UPG group's data. As such, hypothesis H1 was supported by the data.

The t-test result for perceived Web search cost shows that the mean difference = 0.194, t = 2.017 and p = 0.023 (one-tailed). Plus sign in the mean difference, i.e. 0.194, shows that the data from the PG group have greater mean value compared to the data from the UPG group. With this result, it can be concluded that the mean

value of the PG group's data is significantly greater than the mean value of the UPG group's data. As such, hypothesis H2 was supported by the data.

5.8.2 Moderating Effect of Internet Experience

This research hypothesized that Internet experience moderates the gap in perceived Web search benefit and perceived Web search cost between the two Web search strategies. The assessment of the moderating effect of user Internet experience can be observed from Table 5.1.a and Table 5.1.b. In the main model (Table 5.1.a), the path coefficient between Web search strategy and perceived Web search benefit (WSS → PWSB) was $\beta = 0.091$. This number means that, all else are kept constant, the increase of 1 unit of WSS results in the increase of 0.091 unit of PWSB. In the coding, the PG group was coded -1 and the UPG group was coded 1. This result shows that the UPG seekers have more perceived Web search benefit compared to their counterparts as stated in hypothesis H1, which was supported by the data.

In the moderated model (Table 5.1.b), the path coefficient between the interaction variables and perceived Web search benefit (WSSxUIE → PWSB) was significant, i.e. $\beta = 0.169$ and $t = 2.140$ ($p < 0.05$). This number means that, all else are kept constant, the increase of 1 unit of WSS results in the increase of 0.169 unit of perceived Web search benefit. This result shows that the UPG seekers have additional perceived Web search benefit compared to their counterparts with the introduction of user Internet experience as moderating variable. As such, hypothesis H1a was supported.

The path coefficient between Web search strategy and perceived Web search cost (WSS → PWSC) was significant with $\beta = -0.187$, $t = -2.312$ ($p < 0.05$) (see Table 5.1.a). With the same argument as before, this number shows that the PG group

seekers have more perceived Web search cost compared to its counterpart. In the moderated model (Table 5.1.b), the moderation effect of user Internet experience on the relationship between Web search strategy and perceived Web search (WSSxUIE → PWSC) was also significant, i.e. $\beta = -0.228$ and $t = -2.358$ ($p < 0.05$). This result shows that with the introduction of user Internet experience as a moderating variable, the PG group seekers incurred more cost. Thus, it is widen the gap in perceived Web search cost between two different seeking strategies. Therefore, hypothesis H2a was supported by the data.

The moderation effect size can be observed from Table 5.3. R^2 for perceived Web search benefit has changed from 0.008 (in the main model) to become 0.044 (in the moderated model). By using the equation presented in footnote (8), it can be observed that the value of moderation effect size is $f^2 = 0.038$. Subsequently, R^2 for Perceived Web search cost has changed from 0.035 (in the main model) to become 0.1 with $f^2 = 0.072$ (in the moderated model). Double checking with SPSS (see discussion in section 5.5), the changing of R^2 for perceived Web search benefit and perceived Web search cost from the main model to the interaction model is significant. According to Cohen (1988) this effect size is small to moderate. Although the moderation effect size is small, it is evident that user Internet experience has shown its moderation effect on the relationship between Web search strategy and perceived Web search benefit, as well as between Web search strategy and perceived Web search cost.

5.8.3 User Involvement

Perceived Web search benefit has been hypothesized individually to have a positive effect on user involvement (PWSB → UINV). Table 5.1.b shows that

perceived Web search benefit had a strong positive effect on user involvement, i.e. $\beta = 0.445$, $t = 5.301$ ($p < 0.001$).

The difference in the strength of the effect of perceived Web search benefit on user involvement between two different seeker groups can be observed from Table 5.6. The path coefficient of PWSB → UINV for the PG group seekers is $\beta = 0.379$ (SE = 0.077), and for the UPG group seekers is $\beta = 0.476$ (SE = 0.092). Using the procedure shown in equation (5.1) and equation (5.2), these two path coefficients were judged to have different effect strength, i.e. $t = -8.761$, $p < 0.001$. As such, hypotheses H3 and H3a were supported by the data. The data show that the effect of perceived Web search benefit on user involvement in the PG group seekers is weaker compared to those in the UPG group.

In the main model, the negative effect of perceived Web search cost on user involvement (PWSC → UINV) is evident (see Table 5.1.a) in which $\beta = -0.190$, $t = -2.755$ (and $p < 0.01$). However, in the interaction model, the path coefficient of PWSC → UINV is $\beta = -0.159$, $t = -1.709$ ($p < 0.1$). Thus, the negative effect of Perceived Web search cost on user involvement in the interaction model was marginally significant (George and Mallery 2003).

Table 5.6 shows that the path coefficient of PWSC → UINV for the PG group seekers and those from the UPG group is $\beta = -0.226$ (SE = 0.072), and $\beta = -0.232$ (SE = 0.088), respectively. Using the procedure shown in equation (5.1) and equation (5.2), these two path coefficients were judged to have the same relationship strength: $t = 0.572$, $p > 0.1$. As such, hypothesis H4 was marginally supported by the data, while hypothesis H4a was not.

5.8.4 Attitude toward Online Purchase

Table 5.1.b shows that user involvement has a strong positive effect on user attitude toward online purchase (UINV → ATOP) in which $\beta = 0.519$, t-value = 9.657 ($p < 0.001$). This result supports hypothesis H5 that user involvement affects user attitude toward online purchase positively.

Comparing the strength of the effect of user involvement on user attitude from two different groups (see Table 5.6), gives us $\beta = 0.420$ (SE = 0.085) for the PG group dataset, and $\beta = 0.596$ (SE = 0.112) for the UPG group dataset. Fetching these values into equation (5.1) and (5.2) yields t = -13.561 and $p < 0.001$. This result suggests that involvement of the PG seekers has weaker effect on their attitude toward online purchase intention than those in the UPG group.

5.8.5 User Satisfaction

It was also hypothesized in H6 that user involvement has a positive effect on user satisfaction (UINV → USAT). Table 5.1.b shows that the data supports this hypothesis, i.e. $\beta = 0.467$, t-value = 7.232 ($p < 0.001$).

Table 5.6 shows that the path coefficients of UINV → USAT for the PG and UPG groups are $\beta = 0.527$ (SE = 0.069) and $\beta = 0.388$ (SE = 0.116), respectively. Fetching these values into equation (5.1) and (5.2) yields t = 11.152 ($p < 0.001$). This result suggests that involvement of the PG group seekers has stronger effect on their satisfaction than those in the UPG group.

5.8.6 Online Purchase Intention

It was hypothesized that user involvement, attitude toward online purchase, and user satisfaction will have positive effects on online purchase intention. By

observing the data analysis result presented in Table 5.1.b, it can be observed that the relationship between user involvement and online purchase intention was not significant ($\beta = 0.075$, t-value = 1.092). As such, hypothesis H7 was not supported by the data

Table 5.1.b shows that, there is a strong positive effect of attitude toward online purchase on online purchase intention (ATOP → OPI), in which $\beta = 0.450$, t-value = 8.126 ($p < 0.001$). This result supports hypothesis H8. Table 5.1.b also shows that user satisfaction has a positive effect on online purchase intention (USAT → OPI), in which $\beta = 0.248$, t-value = 3.366 ($p < 0.01$). This result shows that the data support hypothesis H9.

Comparing the strength of the effect of attitude on intention in the two different groups (see Table 5.6), gives us $\beta = 0.539$ (SE = 0.074) for the seekers in the PG group and $\beta = 0.368$ (SE = 0.099) for the seekers in the UPG group. By using equation (5.1) and equation (5.2), we will obtain t = 14.987 ($p < 0.001$). This result suggests that attitude of the PG group seekers has stronger effect on their online purchase intention than those in the UPG group.

Table 5.1.b and Table 5.4 show that, for the Combined Dataset, the positive effect of user satisfaction on online purchase intention (USAT → OPI) is evident ($\beta = 0.248$, t-value = 3.377, $p < 0.001$). However, from Table 5.4 it can be observed that this effect is sensitive among the seekers' strategies. In the PG group, the effect is not significant ($\beta = 0.152$, t-value = 1.872, $p > 0.05$), while in the UPG group the strong positive effect is evident ($\beta = 0.304$, t-value = 3.248, $p < 0.01$).

Having said that all hypothesized relationships have been assessed, the following chapter discusses these findings in detail.

Chapter 6

DISCUSION AND IMPLICATIONS

This study sought to unravel the effect of Web search strategy on online purchase intention. It also observes Web search benefit and Web search cost, in term of the perceived Web design elements, the seekers perceive during their Web search activity, as the mediating factors toward online purchase intention. This chapter presents a discussion pertaining to the result of the hypotheses test based on the research model. It also attempts to interpret the findings and draws theoretical and practical implications as well as empirical contribution.

6.1 Discussion of the Model Constructs

This subsection discusses the items' reliability and their corresponding internal consistency. As mentioned earlier, post-experiment questionnaire items were adopted from previously tested items from several sources. This subsection is mainly to show whether the results of this study are consistent with the previous studies in term of the constructs validity.

6.1.1 Manipulation Check

In the pilot study, five items were used for manipulation check to differentiate the planned group from the unplanned group. Neither a single item, nor a combination of several items, was able to separate both groups significantly, although all items were derived from theoretical perspectives (Marchionini 1995) and empirical studies (Navarro-Prieto et al. 1999). As such, these items were not used in the real experiment. Instead, a different item was used. This item was adopted from Swanson

(1987) where the phrase “trial and error” was the important keyword.

The plausible explanation why all items in the pilot study failed to separate the planned group from the unplanned group was because the subjects did not seem to have a clear conception about the difference of the important keywords used, i.e. between “browsing”, “searching”, “top-down”, and “bottom-up.” However, the concept of “trial and error” seems to be understood by the majority of the subjects. As such, in the real experiment, this item was able to separate the above two groups. The evidence is shown in Table 4.3 and Table 4.6 in which t = -3.123 (p = 0.002, 2-tailed).

6.1.2 Formative Constructs: Perceived Web Search Benefit and Perceived Web Search Cost

Formative indicators are “viewed as the cause variables that provide the condition under which the LV [*latent variables*] they are connected to is formed” (Chin 1998b, p. 306). These indicators are assumed not to be correlated to each other, nor do they suppose to measure the same underlying dimension. Bagozzi (1994) stated that, “under formative indicators, the latent variable is defined as a function of measurements” (p. 332). It is “merely thought as a summary index of observed variables” (Bagozzi and Baumgartner 1994, p. 389).

Bollen and Lennox (1991), and Diamantopoulos and Winklhofer (2001) provide several characteristics of formative indicators including:

- the correlations among formative indicators are not explained by the measurement model,
- omitting an indicator is omitting a part of the construct,
- specific pattern of signs or magnitudes do not characterized the correlations among formative indicators, and
- formative indicators do not have error terms.

Multicollinearity problem is a big concern for formative indicators because they are based on a multiple regression (Diamantopoulos and Winklhofer 2001). Multicollinearity happens when the formative indicators, which are supposed not to be correlated to each other, are in fact correlated among themselves (Neter et al. 1996). Several techniques can be used to detect multicollinearity problem, e.g. by inspecting the bivariate matrix (Berry and Feldman 1985, Lewis-Beck 1980), and by inspecting the variance inflation factor (VIF), or its reciprocal called tolerance (Neter et al. 1996)

According to Neter et al. (1996), the VIF score of > 10, or the tolerance score of < 0.1, is an indication of the existence of multicollinearity problem. Based on this cut-off score, by comparing the results from the pilot study and from the real experiment for both Web search benefit (see Table D.5 and Table E.5) and Web search cost (see Table D.6 and Table E.6), it is shown that the VIF score for the majority of the items decreased. Of nine items in Web search benefit, three items ("It was fun exploring this Website", "This Website has an attractive appearance", "This Website is visually appealing") have their VIF score increased slightly. All items in Web search cost have their VIF score decreased. This finding is somewhat consistent with Berry (1993), i.e. multicollinearity problem will decrease if the sample size is increased. Nonetheless, Table D.5, Table D.6, Table E.5, and Table E.6 do not indicate any multicollinearity problem in Web search benefit and Web search cost.

The use of loading for formative indicators is misleading (Chin 1998a). For formative indicators, "internal consistency is of minimal importance because two variables that might even be negatively related can both serve as meaningful indicators of a construct" (Nunnally and Bernstein 1994, p. 489). Instead, indicators' weight is used. The weights provide information about the relative importance of the

formative indicators toward the creation/formation of the corresponding latent variable. On the other hand, Nunnally and Bernstein (1984) also stated that, at best, "loading can be used for identifying which indicator makes the best surrogate for the component score" (p. 307).

This study operationalized two formative variables, i.e. perceived Web search benefit and perceived Web search cost. Table E.16 presents the weight for these two formative indicators. For Web search benefit, two indicators, "I have learned new knowledge from this Website" and "This Website is visually appealing**"** , were significant at the $p < 0.05$ level. One indicator, i.e. "This Website **features** a multimedia presentation", was marginally significant, i.e. $p < 0.1$ (George and Mallery 2003). The rest of Web search benefit indicators were not significant.

For Web search cost, three indicators – "This Website has a loading/processing indicator", "This Website provides an effective navigation aids", and "This Website provides information on how collected user's information will be used" - were significant. The rest of Web search cost indicators were not significant. However, due to the specific characteristic of formative indicators (Bollen and Lennox 1991, Diamantopoulos and Winklhofer 2001), we kept all items in the PLS analysis. Besides, "for indicators that determine the latent variable, the magnitude of the indicator correlations is not explained by the model, therefore we cannot say much about the validity of [*the formative indicators*] as a measure of [*their corresponding construct*]" (Bollen and Lennox 1991, p. 307).

The collected data supported the predictive validity of these two formative latent variables. Specifically, Web search benefit had a significant positive effect on user involvement, and Web search cost had a significant negative effect on user

involvement. As such, the predictive validity for these two constructs was well substantiated.

6.1.3 Comparison of the Planned Group and Unplanned Group

This study compares whether the seekers who follow a search plan strictly (the planned group) and the seekers who do not follow any search plan (the unplanned group) have the same online purchase intention. The result of the comparison is presented in Table 5.6.

The difference in the relationship strength among constructs in both groups is evident from Table 5.6. This table only shows those significant relationships in both groups. In total there are five significant relationships that exist in both groups. Table 5.6 shows that four relationships were statistically different in their strength. The effect of Web search benefit on user involvement (PWSB → UINV), and user involvement on attitude toward online purchase (UINV → ATOP) in the unplanned group was significantly stronger than those in the planned group. However, the effect of user involvement on user satisfaction (UINV → USAT), and attitude toward online purchase on online purchase intention (ATOP → OPI) for the unplanned group was significantly weaker than those in the planned group. One relationship that shows the same effect strength in both groups was between Web search cost and user involvement (PWSC → UINV).

Table 5.4 shows that no significant relationship between user involvement and online purchase intention (UINV → OPI) was found in either group. On the other hand the significance of the relationship between user satisfaction and online purchase intention (USAT → OPI) was sensitive upon the seekers' strategy. This relationship is significant in the unplanned group, while it was not the case in the planned group.

Figure 6.1 presents the comparison of the relationship strength of the hypothesized relationships between the planned group and the unplanned group.

6.1.4 Internet Experience

In this study, Internet experience is hypothesized to moderate the relationship between Web search strategy and perceived Web search benefit as well as perceived Web search cost. Table E.9.b (rows with WSSxUIE labels) shows that the reliability scores for all items, and the internal consistency, i.e. ρ_{η_3} = 0.931, were very high. Table 5.2 and Table 5.3 present the increase of R^2 of perceived Web search benefit and perceived Web search cost, and its moderation effect size. According to Cohen (1988), the moderation effect size is between small and medium, i.e. f^2 = 0.038 for Web search benefit, and f^2 = 0.072 for Web search cost.

The moderation effect of user Internet experience is also evident from Table 5.1.a and Table 5.1.b. These two tables show that the gap in the perceived Web search benefit and Web search cost between two information seeking strategies widen with the presence of user Internet experience as a moderating variable. In particular, the data supports the hypothesis that user Internet experience widens the gap of the perceived Web search benefit between the PG group and the UPG group. In the main model, the path coefficient between Web search strategy and Web search benefit (WSS → PWSB) is 0.091. In the interaction model, the path coefficient between the interaction variables and Web search benefit (WSSxUIE → PWSB) is 0.169. This finding is depicted in Figure 6.2.a.

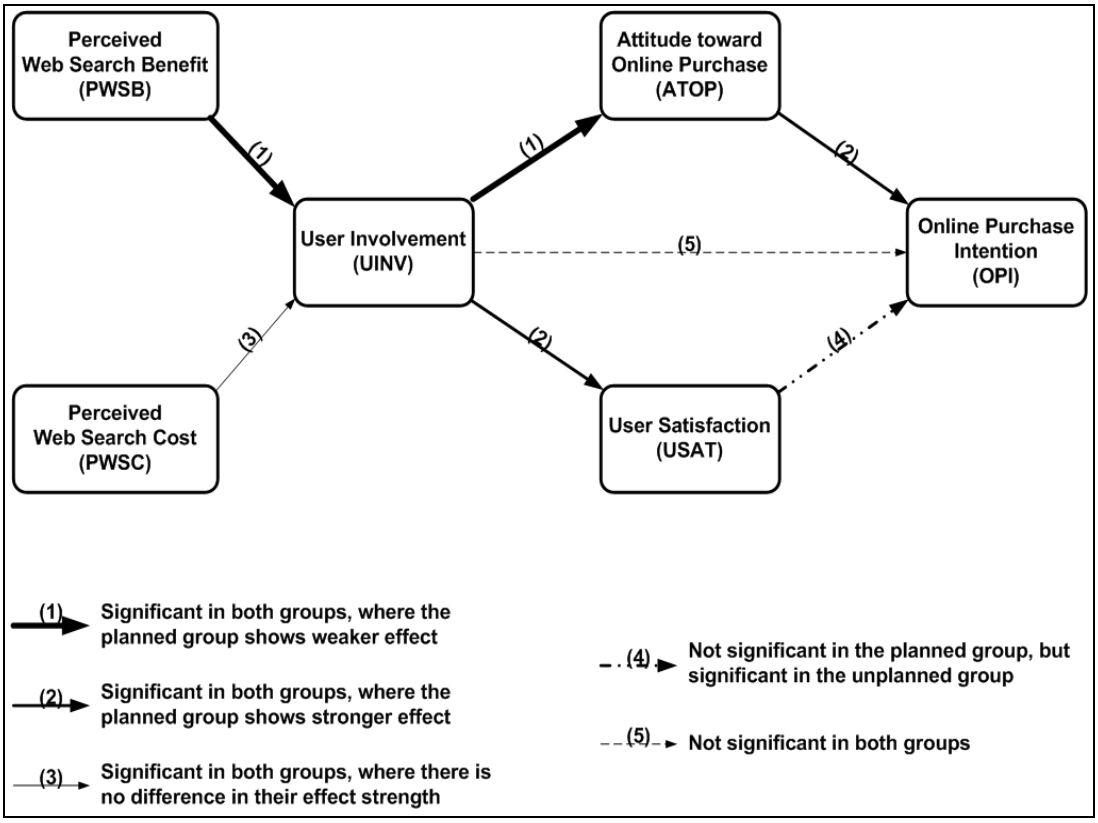

Figure 6.1 Paths comparison between the planned group and the unplanned group

The data also support the hypothesis that user Internet experience widens the gap of the perceived cost between the PG group and the UPG group. In the main model, the path coefficient between Web search strategy and perceived Web search cost (WSS → PWSC) is -0.190. In the interaction model, the path coefficient between the interaction variables and perceived Web search cost (WSSxUIE → PWSC) is -0.228. This finding is depicted in Figure 6.2.b.

6.1.5 User Involvement

Table E.9.a and Table E.9.b show that all items in user involvement had reliability scores of greater than or equal to 0.707. Thus, every indicator is deemed reliable. The internal consistency for user involvement was very high, i.e. ρ_{η_3} = 0.914. As such, construct validity of user involvement was deemed satisfactory.

The predictive validity of user involvement can be observed from Table 5.1.a and Table 5.1.b. These table show that user involvement has a positive effect on attitude toward online purchase ($\beta = 0.519$, $p < 0.001$) as well as on user satisfaction ($\beta = 0.467$, $p < 0.001$). As such, the predictive validity of user involvement toward attitude and user satisfaction was satisfactory. However, user involvement has no direct effect on online purchase intention ($\beta = 0.075$, $p > 0.1$). Thus, the predictive validity of user involvement toward purchase intention was not supported by the data.

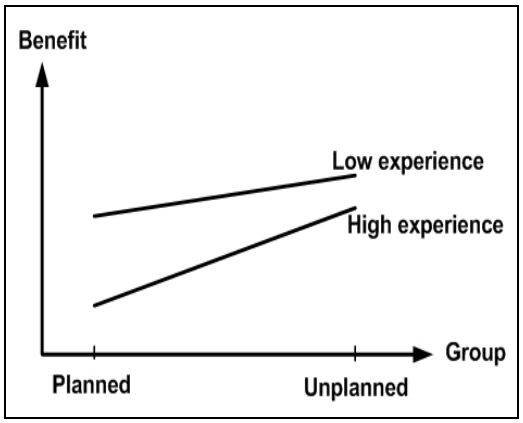

Figure 6.2.a The influence of Internet experience on the perceived Web search benefit of different groups.

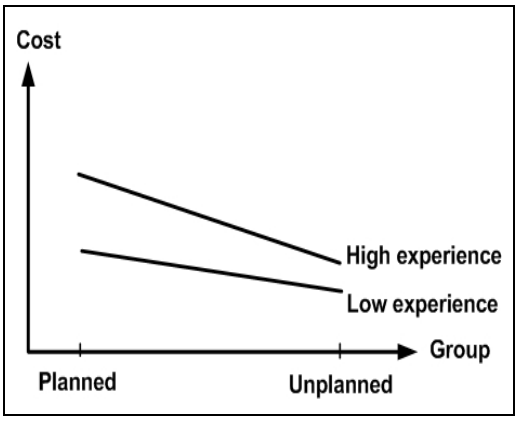

Figure 6.2.b The influence of Internet experience on the perceived Web search cost of different groups.

6.1.6 Attitude toward Online Purchase

All items in attitude toward online purchase had their reliability scores greater than the threshold score, i.e. greater than 0.707. Its internal consistency was also very high, i.e. $\rho_{\eta_4} = 0.925$ (see Table E.9.a and Table E.9.b). As such, construct validity of attitude toward online purchase was deemed reliable. Items were adopted from several sources (Al-Gahtani and King 1999, Teo et al. 2003, van der Heijden et al. 2003, Barki and Hartwick 1994) that have been tested before. As such no discrepancy

regarding the reliability and the validity of this construct compared to the previous result was found.

Table 5.1.a and Table 5.1.b show that attitude toward online purchase had a significant strong positive effect on online purchase intention with $\beta = 0.450$ ($p < 0.001$). This finding is consistent with the TRA, TPB, TAM, as well as several other related studies. As such, the predictive validity of attitude toward online purchase was found to be satisfactory.

6.1.7 User Satisfaction

Referring to Table E.9.a and Table E.9.b, we can observe that the reliability scores of all items in user satisfaction were greater than 0.707. Its internal consistency was also very high, i.e. $\rho_{\eta_5} = 0.925$. This result showed that construct validity for user satisfaction was reliable. Its predictive validity was also strongly supported by the data in which user satisfaction had a positive significant effect on online purchase with $\beta = 0.248$ ($p < 0.01$) (see Table 5.1.a and Table 5.1.b). Items for user satisfaction were adopted from Lee et al. (2003) and Teo et al. (2003). As such, the result of this study shows no discrepancy in term of the item reliability and its internal consistency compared to the previous studies.

6.1.8 Online Purchase Intention

Items for online purchase intention were adopted from Song and Zahedi (2001). Table E.9.a and Table E.9.b show that all items had very high reliability scores. Its construct validity was also very high, i.e. $\rho_{\eta_6} = 0.948$. Its predictive validity cannot be calculated because online purchase intention was the final dependent variable.

6.2 Discussion of the Findings

This study investigates the effect of the seekers' strategy toward their online purchase intention. It compares Web search benefit and Web search cost that the seekers perceive during their online activity in term of the perceived existence of the Website design elements. The summary of hypothesis test is presented in Table 6.1.

Table 6.1 Results of the hypothesis tests.

Hypothesis		Result
H1:	*Seekers who strictly follow a search plan will perceive less Web search benefit compared to those who do not follow any plan*	Supported
H1a:	*Higher Internet experience will increase the gap in the perceived Web search benefit between the two Web search strategies*	Supported
H2:	*Seekers who strictly follow a search plan will perceive more Web search cost compared to those who do not follow any plan*	Supported
H2a:	*Higher Internet experience will increase the gap in the perceived Web search cost between the two Web search strategies*	Supported
H3:	*Perceived Web search benefit will have a positive effect on user involvement*	Supported
H3a:	*The strength of the positive effect of Web search benefit on user involvement will be different for different seeking strategies*	Supported
H4:	*Perceived Web search cost will have a negative effect on user involvement*	Marginally supported
H4a:	*The strength of the negative effect of Web search cost on user involvement will be different for different seeking strategies*	Not supported
H5:	*User involvement will have a positive effect on user attitude toward online purchase*	Supported
H6:	*User involvement will have a positive effect on user satisfaction*	Supported
H7:	*User involvement will have a positive effect on purchase intention*	Not supported
H8:	*Attitude toward online purchase will have a positive effect on online purchase intention*	Supported
H9:	*User satisfaction will have a positive effect on online purchase intention*	Supported

6.2.1 The Effect of Web Search Strategy on Perceived Web Search Benefit and Perceived Web Search Cost

Perceived Web search benefit was manifested as the motivators the seekers perceive during their information seeking activity. The perceived motivators were those Website design elements that make a Website enjoyable to visit, visually

appealing, and offer users a higher interaction control. Table E.8 shows that there was a significant mean difference in the perceived Web search benefit, as well as the perceived Web search cost, of the seekers who strictly followed a search plan (the planned seekers) compared to those who did not follow any search plan (the unplanned seekers). Table E.8 shows that the planned seekers perceived less Web search benefit (hypothesis H1) compared to the unplanned seekers.

The perceived Web search cost was manifested as the perceived hygiene factors. The most obvious incurred cost was the time needed to get what the seekers want. Navigation could also cause some problems. Table E.8 shows that there was a significant mean difference in the perceived Web search cost of the planned seekers compared to the unplanned seekers. It is shown that seekers in the planned group incurred greater Web search cost compared to those in the unplanned group (hypothesis H2).

In this study, the planned strategy and the unplanned strategy was derived from the analytical strategy and the browsing strategy (Marchionini 1995), respectively. According to Jul and Furnas (1997), browsing is to see what is available. The word “what” could mean the Web content, its appearance, etc. It was argued that seekers who employ the unplanned strategy were able to move around the Website they visited freely. As such, they were able to perceive more Website design elements. The above findings support this argument that seekers who have more chances to wander around would perceive more motivators and hygiene factors, thus more benefit and less cost.

A study by Nah (2003) revealed that the tolerable waiting time was about 2-3 seconds before seekers abandon and leave the visited website. However, she also stated that the waiting time tolerance was also influenced by user experience with less

experience users being more tolerant. Although tolerable waiting time was not measured in this study, one item of the post-experiment questionnaire items asked the subjects to perceive whether “This Website gives a very fast response/loading time” on 7-point Likert scale. The data, after it was reversed, shows that the mean for this item (see Appendix B) was 2.43 (standard deviation = 1.197). After the data was reversed, smaller value means lower cost. This shows that response/loading time did not cause a big problem to the subjects.

On the navigation part, “effective navigation aids” has a mean of 3.29 (standard deviation = 1.301), and “clear direction” has a mean of 3.58 (standard deviation = 1.428). Thus, subjects did not feel any objection in dealing with the response/loading time and navigation. However, subjects did not seem to be happy with the handling of privacy and security issues. The mean for “how user’s information is collected”, “how collected information will be used”, “whether the information is transmitted security” and “access requirement” is 4.05 (standard deviation = 1.532), 4.36 (standard deviation = 1.505), 3.86 (standard deviation = 1.585), and 4.05 (standard deviation = 1.868), respectively.

The overall Web search benefit has its mean of 4.512 (standard deviation = 0.865), which is slightly above the average, i.e. 4, and the mean for the overall Web search cost is 3.6 (standard deviation = 0.742), which is slightly below the average, i.e. 4. This shows that compared to the incurred cost, most subjects considered their information-seeking activity to be worth something, e.g. awareness of new products being released on the market, come across with interesting bargains, etc.

6.2.2 Moderating Effect of Internet Experience

Hypothesis H1a states that higher user Internet experience will increase the gap in the perceived Web search benefit between the two Web search strategies. This hypothesis was supported by the data (see Table 6.1).

Experienced users have a better mental model compared to novices (e.g. Olfman and Shayo 1997, Marchionini 1989). With better mental model, experienced users are particularly familiar with Website structure that can help them in screening out the competing/irrelevant stimuli. As such, experienced users can have better focus on the task given, while novices are more likely to be influenced by what they see on screen (Navarro-Prieto et al. 1999). Experienced users are also more skillful. However, as stated earlier, this study adopts the fact that the more users perceive the motivators, the more benefit the users get from their activity. Novices perceive Website structure more complex than experienced users (Bruner and Kumar 2000). However, this could be the advantage the novices can get as they can learn and familiarize themselves with Websites structure. As such, more experienced users perceive less Web search benefit than novices.

In this study, seekers in the planned group had restricted movement around the Website, as they had to follow their search plan strictly. On the other hand, seekers in the unplanned group were allowed to move freely as they had not followed any search plan. With the restriction imposed on the planned group's seekers, their online experience might not as enjoyable as those in the unplanned group. For example, the planned group's seekers might not realize that actually in the Website they visited, there was multimedia feature, e.g. music or animation. Also, they might not have a chance to see the whole online store atmosphere represented as the Website's visual appearance. They might also have missed the fact that the Website they visited was

not as credible as they thought. These several facts could only be realized if seekers had chances to wander around the Website freely.

Hypothesis H2a states that higher user Internet experience will increase the gap in perceived Web search cost between the two Web search strategies. This hypothesis is also supported by the data (see Table 6.1). In this study, Web search cost is manifested as the perceived hygiene factors.

6.2.3 The Role of Web Design toward User Involvement

Involvement is a function of situational and intrapersonal determinants (Zaichkowsky 1985). According to Celci and Olson (1988), involvement "has two broad sources: (1) physical and social aspects of the immediate environment, and (2) intrinsic characteristics of the individual," (p. 211). These are situational and intrinsic sources of involvement. Situational sources are dynamic and changeable; thus, situation change when environment change. On the other hand, intrinsic sources "are relatively stable, enduring structures of personally relevant knowledge, derived from past experience and stored in long-term memory" (p. 212). Two antecedents of involvement can be related to those motivators and hygiene factors of Website design. Physical and social aspects of the web environment are represented by the hygiene factors and several motivators like visual appearance, and intrinsic characteristics of the individual are related to several motivating factors, like enjoyment and cognitive outcomes.

Fortin and Dholakia (2005) have reported that user involvement is indirectly affected by media vividness and interactivity. This indirect relationship is through social presence (or telepresence in Hoffman and Novak 1996). According to Steuer (1992), vividness relates to the breadth and depth of the message. Breadth relates to

the number of sensory dimensions, cues, and senses presented (colors, graphics, etc.), while depth relates to the quality and resolution of the presentation (bandwidth). Interactivity is a communication that "reflects back on itself, feeds on, and responds to the past" (Newhagen and Rafaeli 1996, p. 6). It is also considered as an important factor of Web success. There are two levels of interactivity: personal interactivity and machine interactivity. Machine interactivity happens between human and machine to access hypermedia content (Hoffman and Novak 1996).

The result of this study shows that perceived Web search benefit affects user involvement positively (hypothesis H3), while perceived Web search cost affects user involvement negatively (hypothesis H4). These findings can be explained as follow. When subjects navigate a Website, they have a chance to enjoy their surfing activity while unconsciously absorbing relevant knowledge and experiencing a new web surfing experience. This perceived motivational situation may result in a psychological state of involvement (Kappelman 1995). On the other hand, unfamiliarity with a Website structure, unpleasant visual appearance, navigation difficulties, and low loading speed may cause users much effort.

Appendix B shows that the mean of user involvement of 4.397 (standard deviation = 1.027). Overall Web search benefit has its mean of 4.513 (standard deviation = 0.865), and overall Web search cost have its mean of 3.595 (standard deviation = 0.742). Since the mean of Web search cost is slightly lower than the mid point, i.e. 4, and the overall benefit is higher than the mid point, i.e. 4, it can be understood that its resultant has a positive effect on user involvement.

6.2.4 User Involvement and Attitude toward Online Purchase

Laurent and Kapferer (1985) have demonstrated that involvement and attitude were two different concepts, although they were significantly related (Barki and Hartwick (1989). Barki and Hartwick (1994) stated that user involvement refers to "a belief – the extent to which a user believes that a new system is both important and personally relevant" (p. 62). In the TRA and the TPB, personal belief is said to be the determinant of attitude.

Attribution theory (Heider 1958) suggests that attitude is formed and changed based on the users' interpretation of their own behavior and experience. Users may involve in their online activity for a long time. A longer usage of a Website implies that users are having a high level of involvement that stimulates them to be more attentive to the presented object (Petty and Cacioppo 1979). At the same time, they are having an enjoyable experience that may lead to the formation of, or positively change, attitude toward another behavior, i.e. online purchase.

The result of this study shows that user involvement affects attitude toward online purchase very strongly positively. This result is consistent with the TRA and the TPB, in which a belief has a direct relationship with attitude. It is also consistent with Griffith et al. (2001). In addition, Figure 6.2 shows that the effect of user involvement on attitude in the unplanned group is stronger than that in the planned group. This phenomenon is explained as follows.

As stated, in this study, user involvement relates to the outcome of user interacting with a Website. As users have more chance to interact with a Website, as in the case with the unplanned group's subjects, they have better chance to become more engaged with and concerned about the presented material (Steuer 1992). This could lead to the situation where subjects in the unplanned group perceived that the

Website was easier to use. In TAM (Davis 1989) and several other empirical studies (e.g. van der Heijden et al. 2003), perceive ease of use is regarded as an antecedent of attitude. Although, in this study, perceive ease of use is not measured, this construct can be used to explain why the effect of user involvement on attitude toward online purchase in the unplanned group is stronger than that in the planned group.

6.2.5 User Involvement as a Predictor of User Satisfaction

The finding of this study that user involvement influences user satisfaction positively is consistent with Zahedi et al. (2001). The data show that the overall user satisfaction has mean value of 4.673 (standard deviation = 1.169) (Appendix B). Although it is only slightly higher than the neutral point (4 is the neutral point), the result shows that subjects were satisfied with the quality of, and quite pleased with their visit to, the Website used in the experiment. In addition, Figure 6.2 shows that the effect of user involvement on satisfaction in the planned group is stronger than in the unplanned group. This phenomenon can be explained as follows, in which we have to go back again to the definition of satisfaction by Bruce (1999) that it can be regarded as a composite of material and emotional responses to a particular activity.

It has been said earlier that subject movement in the planned group was constrained by having to follow their plans strictly. Materially, these subjects may not be too satisfied with the interaction. However, since these subjects can have more focus on the information they need to search, their emotional response could have been higher than their material response. This situation is the other way around for those in the unplanned group. Emotional response could be more motivational than material response – that is situational, since it is more permanent or enduring (Muncy and Hunt 1984).

6.2.6 Online Purchase Intention

The Expectation-Confirmation Theory (Oliver 1980) posits that satisfaction with a product or service is the primary motivations for its continuance, while dissatisfied users discontinue it and/or switch to alternative services (Bhattacherjee 2001a). Based on the same theory, the existence of a positive relationship between user satisfaction and purchase intention as well as repurchase intention has also been demonstrated by Oliver (1980), Oliver and Linda (1981), and (Bhattacherjee 2001a, 2001b). Satisfied customers are more likely to perform certain behavior (Anderson and Sullivan 1993). Several other empirical studies have shown how satisfaction affects intention, e.g. Zahedi et al. (2001), Lee and Lee (2003), and Anderson and Sullivan (1993).

The finding of this study is consistent with the above empirical studies in which user satisfaction affects online purchase intention positively. However, as evident from Figure 6.1, this study found that the effect of user satisfaction on online purchase intention was sensitive upon the seekers' strategy. The seekers from the unplanned group demonstrated that the effect was positively significant, while it was not the case for those in the planned group.

According to Bruce (1999), there are two types of response to a particular activity leading to user satisfaction, namely emotional and material responses. Emotional response relates to whether users' expectations have been matched with their requirements. Material response relates to system usage that leads the users to have a better understanding of the system's features. In the proposed research model, user involvement, as the result of user interacting with a Website (Griffith et al. 2001), was said to influence user satisfaction. In this study, four items were used to measure overall user satisfaction. Two of them related to the user's visit, one item

related to the quality of Website used in this study, and the last item related to the user's freedom of moving around the Website. Those in the planned group have been instructed to strictly follow their written plans, while those in the unplanned group could move around freely. This restriction could emotionally and materially influence satisfaction of those in the planned group.

According to ECT, when users visit a Website they have some sort of expectation of what they want to see and experience with the Website usage. However, since the movement of the subjects in the planned group was constrained, the discrepancy of the subjects' expectation and the perceived Website's performance could arise. As such, emotionally, the subjects in the planned group may have been less satisfied compared to their counterparts. Furthermore, as the movement is constrained, the subjects in the planned group could not interact with the Website as "intimately" as their counterparts. They may not be able to spot important Web design element(s) to influence their intention. As such, those in the planned group are less satisfied, materially.

This study also shows that there was a positive influence of attitude on online purchase intention for all datasets (combined dataset, planned group, and unplanned group). This finding is consistent with TRA, TPB, and also TAM. Furthermore, Figure 6.2 shows that the effect of attitude on intention in the planned group is stronger than that in the unplanned group. This phenomenon could be due to the fact that the subjects in the planned group were more focused with their activity, i.e. information search. This situation leads the subjects in the planned group to perceive more complete product-related information than their counterparts. More complete product-related information would enhance the planned group's attitude toward purchase, which in turn increases their intention to purchase online. This finding is

consistent with Shim et al. (2001).

It was hypothesized that user involvement affects online purchase intention positively. However, the result of this study shows that no significant relationship was found in all datasets, even by lowering the confidence level. According to Barki and Hartwick (1994), user involvement is a belief (see section 6.2.3). By referring to the TRA and the TPB, there is no direct relationship from belief to intention. Beliefs will influence attitude, which in turn influences intention. The fact that there is no direct relationship between user involvement, as a belief, and online purchase intention found in this study is consistent with the TRA and the TPB.

6.3 Implications

This subsection presents several implications of this study. Theoretical implications are discussed in terms of the overall conceptual framework and each of the theoretical perspectives. Empirical implications are discussed in term of the data analysis technique used in this study. Practical implications are discussed in term of suggestions to Web designers.

6.3.1 Theoretical Implications

This study proposes a conceptual model describing how Web search strategy influences online purchase intention. The result of this study provides support for the proposed conceptual model. It explains about 43% of the variance of online purchase intention.

This study is novel in several ways. First, it proposes a view of Website design elements that translates motivators and hygiene factors into Web search benefit and Web search cost, respectively. This view is based on the assumption that information

seeking activity is a reciprocal exchange transaction, in which the Internet is the medium of the transaction and information is the exchange currency. In an exchange model of interpersonal communication (Gatignon and Robertson 1986), the cost-benefit analysis was conducted due to the nature of information giving (the providers side) and information seeking (the seekers side). This study focuses on the cost-benefit analysis from the seekers' side. This study pinpoints the importance of conducting a cost-benefit analysis of an exchange medium, but not between the actors who are involved in the exchange transaction.

Second, it proposes a theoretical framework to study the effect of Web search strategy on online purchase intention. Studies that investigate the effect of Website design on user satisfaction, user attitude, and purchase intention have been done, e.g. Zahedi et al. (2001) and Te'eni and Feldman (2001). This study is different from the previous studies in which it does not treat the Web design elements per say, but in the form of the perceived Web search benefit and perceived Web search cost.

6.3.2 Empirical Implications

Several empirical implications are worth mentioning. First, this study could be the first attempt to consider a cost-benefit of information seeking in term of the perception of what Website design elements were present. As such, this study provides important empirical evidence and the first venue to study the Web design success factors from the point of view of the benefit and cost that seekers obtain or perceive during their online activity.

Song and Zahedi (2001) present a framework to test the effect of Web design on the intention to purchase. Their framework can be summarized as Web design → belief → attitude → intention. Although the main focus of this study is to investigate

the effect of Web search strategy on online purchase intention, this study has a similar flow relationship as in Song and Zahedi (2001). On one hand, the seekers have to work with a particular Website to find the information of interest. By using a Website they perceive the benefit and the cost, manifested as the perceived Web design elements. On the other hand, according to Barki and Hartwick (1994), user involvement is a belief (see subsection 6.2.3). Thus, the flow relationship of "online benefit / cost → involvement → attitude → intention" can be established. As such, the result of this study can be considered as an empirical validation of Song and Zahedi (2001) framework. This is the second empirical contribution of this study.

There is very limited number of studies that operationalizes formative latent variables. This study operationalizes two formative latent variables. These two formative latent variables are Web search benefit and Web search cost. The approach to deal with the formative latent variables used in this study is different from the previous studies, e.g. Mathieson et al. (2001). Mathieson et al. used both the redundancy model (reflective and formative model of the same latent variable were used) and the formative model. This study only uses the formative model, because conceptually, Web search benefit and Web search cost were built from several items that were not supposed to relate to each other. The fact that their predictive validity was supported by the data shows that the usage of the formative model in this study alone is sufficient.

6.3.3 Practical Implications

The unplanned strategy was derived from the browsing strategy (Marchionini 1995) in which seekers can move around freely. This strategy is excellent for those who have no idea of what they want to find and want to see what information is

available (Jul and Furnas 1997). It allows seekers to find products without knowing any keyword in advance. Seekers with no search plan are guided by what they see on the screen (Suchman 1987). On the other hand, the planned strategy, which was derived from the analytical strategy (Marchionini 1995), is an excellent strategy when the information is known or at least the keyword that lead to the information of interest is known.

In support for the above assertions, and based on the result of this study, several practical suggestions, mainly for Web designers, are offered. First, to support the unplanned strategy, a Website should be designed in such a way that allows the seekers to move freely. This means that the seekers are able to jump from one part to another part in the same page, or from one page to another page, easily. Mason et al. (1991) have shown that users are willing to spend more time in a Website when they are able to move freely.

Second, to support the planned strategy, a Website should be designed in such a way to allow the seekers to move in a top-down or a "tree-like" fashion. This design strategy is to make sure that the seekers can start their search activity from the top-most level of information categories and continue to explore subcategories until they find what they want. To allow the seekers to return to the higher subcategories, links must be carefully designed.

Online customers cannot have a real look and feel about the product they are interested in. They may base their decision to purchase that product on their prior experience and what they see on the screen, especially if the products are not available from the local stores. The result of this study shows that Web search benefit, manifested as the perceived motivators, has a very strong positive effect on user involvement. Although this study takes the direction in which user involvement

means how intimate the seekers have about the Website they work on, unconsciously the seekers may develop product involvement as well. As such, the third implication for Web designers is for them to develop an appealing Website to please general customers, as well as empowering users that integrates the fun factor (Nielsen 2002).

Online customers are both traditional shoppers as well as computer users (Koufaris et al. 2002). As computer users, customers always want to have a user-friendly system that they can interact with as easily and as enjoyable as possible. As such, the fourth implication for Web designers is that they should not only consider technical aspects, ease of navigation, and privacy policy–the perceived cost, but they also need to consider other factors that can improve users' knowledge and enjoyment–the perceived benefit.

Chapter 7

CONCLUSION

This chapter presents the conclusion of this study. It summarizes the contributions and the limitations of this study. At the end of this chapter, directions for future study as stimulated by the result of this study are suggested.

7.1 Contributions

With the backdrop of economic exchange, this study proposed a model to apply a cost-benefit analysis based on the perceived presence of Web design elements. This model was tested using a laboratory experiment. The following are several contributions of this study.

- It answers the research questions about the effect of Web search strategy on online purchase intention. It also shows that different seeking strategies lead to different effect strength of one construct on another.
- It offers the way to study Website design and its effect on customer behavior by taking into account the benefit and cost of online activity related to Website design elements.
- It indirectly validates the TRA and the TPB by showing that user involvement, as a belief, does not directly relate to intention, but through an attitude.
- It validates that Web design elements under the category of motivators need to be considered when designing a Website so as to prolong the visit. In other words, on one hand, an assurance that a Website is functional is

important. On the other hand, the “fun” factor, like animation related to certain products and background music, needs to be considered as well.

- Previous studies that operationalized formative indicators along with the PLS was very limited. This study could serves as an additional empirical study that operationalizes both formative and reflective indicators in one model.

In term of theoretical contributions, this study provides contributions in the following ways. First, it proposes one way to see Web design elements as benefits and costs the users perceive during their online activities, including information search activity. Supporting arguments that certain Web design elements are the perceived benefits, and the others are the perceived costs have been discussed in detail in the previous chapters.

Second, this study proposes an extension of an exchange model of interpersonal communication (Gatignon and Robertson 1986). In particular, this study proposes a cost-benefit analysis related to the exchange medium, i.e. Website. It has been mentioned that Website is an exchange medium. Through this medium, users and owner of the Website (or the company featured in the Website) who have agreed on certain aspects exchange tangible and intangible goods.

7.2 Limitations of the Study

Several limitations are discussed in this section, including the limitation of the research model, the methodology, as well as the validity of the result of this study. As much as the validity is concern, validity is “the best available approximation to the truth of a given proposition, inference, or conclusion” (Trochim 2001, p. 20). It is

typically divided into four types: conclusion validity, internal validity, construct validity, and external validity. The limitations of this study are assessed based on the threats to the above validity categories.

7.2.1 Limitation of the Research Model

This study, in particular, proposes that perceived Web search benefit and perceived Web search cost to influence user involvement, which in turn influences user satisfaction. According to Griffith et al. (2001), user involvement is the result of users interacting with a system. In this case, users need to interact with a Website to find information about products of interest.

As it has been mentioned earlier, Web search benefit and Web search cost are manifested as the Web design elements the users perceive during the course of their interaction with a Website. As such, perceived Web search benefit and perceived Web search cost are not considered as the result of the interaction. It is user involvement that is considered as the result of the interaction.

To follow Zaickowsky (1985), user involvement is defined as the interaction that is important and personally relevant. The interaction is both important and personally relevant as users are able to perceive more benefit than the incurred cost. Thus, users are more willing to continue with their interaction. On the other hand, if users perceive lesser benefit than the incurred cost, they are more likely to stop the interaction. In other words, the interaction is not important and relevant anymore.

This study defines user satisfaction as the overall satisfaction on the Website design as well as the interaction. Many studies have shown that Website design affects user satisfaction, as well as that user involvement affects satisfaction. It has been mentioned that when users perceive more benefit than the incurred cost, users

are more willing to continue their interaction with certain Website. This is to imply that users are happy with their interaction. The interaction helps users to perceive the necessary information that could enhance their online purchase intention. On the other hand, satisfied users (with the Web design only) do not necessarily have longer interaction. This is to imply that the interaction is not just clicking the link for no reason, but it is for something more useful, i.e. finding information pertaining to the products of interest and its related information like payment mode, delivery times, etc.

Cognitive style refers to the consistent patterns in the way people process information to make decisions (e.g. Messick 1976, Ruble and Cosier 1990). Based on cognitive style, Allison and Hayes (1996) divide learners into analytical learners and intuitive learners. The former is more in favor toward structured approach to problem solving and rely heavily on “hard data”. The later prefers open approaches and more exploration. On their study, Navarro-Prieto et al. (1999) identified three general pattern of searching, namely bottom-up, top-down, and mixed strategy. They also found that the above strategy is related to the subjects’ experience. It has been mentioned that more experience subjects prefer to use structured or analytical approach, while novices prefer to be more explorative (Marchionini 1995, Allison and Hayes 1996). This is the limitation of this study, in which the cognitive style was not included in the research model.

7.2.2 Limitation of the Research Methodology

The research methodology employed for this study was laboratory experiment in which subjects were grouped into two groups, namely the planned group and planned group. Subjects in the planned group were supposed to follow their own predetermined plan when they were asked to find information about product, and

those in the unplanned grouped were not to follow any predetermined plan. For the unplanned grouped there was no concern about the methodology being used. However, for the planned group there is a concern in which their plans were not checked after they finished with the experiment. This may raise some questions on whether subjects in the planned group really followed their predetermined plan. At the time when the experiment was conducted, this limitation was not realized. As such, no action was taken to trace back whether their searching activities followed their search plans.

Another limitation of the research methodology is due to the fact that for subjects in the PG group they have to write down their search plan before they are allowed to start searching for relevant information. This may not natural for most people. However, according to Xie (2000), information seeking behavior is part of a goal-related plan. This means that no action without any a priori plan. This is to imply that whether the plan is concrete or partial, subjects need to have some plan. This is exactly why in this experiment, subjects in the PG group were asked to write down their plan before they start searching.

7.2.3 Threats to Validity

7.2.3.1 Threats to Conclusion Validity

Conclusion validity refers to whether there is a relationship between cause and effect (Trochim 2001). Threat to conclusion validity cast doubts on whether to accept the hypothesized relationship based on a given alpha level and the obtained variances. Two of several interrelated factors that may influence conclusion validity are sample size and alpha level. In this study, there are seven constructs and one moderating construct, and the largest number of indicators in one construct is ten. Given the

number of constructs and the largest number of indicators in one construct, the sample size of 235 is more than sufficient (http://disc-nt.cba.uh.edu/chin/plsfaq/plsfaq.htm), even for the analysis of two different groups as discussed in section 5.6. Therefore we conclude that sample size did not compromise the result of the hypothesized relationship.

Thirteen hypotheses were tested in which two of them were not significant (H4a and H7), and one (H4) was marginally supported by the data. A possible explanation is that the data do not have adequate power to show that H4a and H7 exist, or that the causal relationship between user involvement and online purchase intention (H7) does not exist, because the way user involvement was operationalized. In addition, the negative effect of online cost on user involvement (H4a) is not sensitive upon different seeking strategies.

The hypothesis test also detects that the negative effect of online cost on user involvement was marginally supported ($p < 0.1$) by the data (H4). In other words, we compromise that the negative effect exists on the price of increasing type I error.

Another conclusion validity threat comes from the fact that this study differentiates only the planned group from the unplanned group, i.e. 2-point scale. In this case, the value of the dependent variable will amass around the two independent variable values. As such the true and logical relationship between seeking strategy and online benefit as well as online cost cannot be guaranteed.

7.2.3.2 Threats to Internal Validity

Internal validity refers to “the validity with which statements can be made about whether there is a causal relationship from one variable to another in the form in which the variables were manipulated or measured” (Cook and Campbell 1979, p.

38). The fact that two variables are correlated does not mean that the causal relationship exists (Trochim 2001). In a multi-group experiment, one threat to the internal validity is referred to as social interaction threats. Social threats to internal validity happen when subjects "react not only to what affect them, but also to what is happening to others around them" (p. 173). Further, Trochim (2001) stated that by isolating groups from each other, social threat could be reduced. In this study, when the real experiment was conducted, subjects from both groups were in fact separated from each other. As such, social threat should not affect the internal validity severely.

7.2.3.3 Threats to Construct Validity

Construct validity refers to "the degree to which inference can legitimately be made from the operationalizations in your study to the theoretical constructs on which those operationalizations are based" (p. 64). Threats to construct validity result in confounding, i.e. "a measured effect attributed to a variable that is actually due to an unmeasured co-variable" (http://www.cirem.org.uk/definitions.html). A labeling issue could become one of the construct validity threats (Trochim 2001). In this study, the wording of the questionnaire items was carefully chosen. However, the ambiguity might be hard to detect. Besides, due to different interpretation, subjects may have interpreted the same items differently.

Hypothesis guessing is another construct validity threat. In order to minimize this threat, theoretical foundations and empirical studies have been carefully and extensively reviewed to provide precise definitions and operationalization of the said constructs. However, the fact that the model explains 43% of the variance in the online purchase intention suggests that additional predictors may have been missed.

As such, future study might be devoted to improve the explanatory power of the proposed model.

7.2.3.4 Threats to External Validity

External validity refers to the whether the result of the study can be generalized to another context (Trochim 2001). An experiment has limited generalizability to different settings, times, treatments, and persons (Trochim 2001, Salkind 2000). In other words, any attempt to replicate this study must be done cautiously and carefully.

This study employed two groups of subjects. However, in the experiment these two groups were separated as to get more manageable situation. On one hand, this practice reduces the social interaction threat to internal validity (see subsection 7.2.3.2). On the other hand, it reduces the external validity (Trochim 2001). .

Another threat to external validity comes from the fact that this study employed only one Website, i.e. www.amazon.com. Only one Website was used because this study is not trying to compare different Websites.

7.3 Recommendations for Future Study

The result of this study and the identified limitations lead to the following recommendations for future studies:

- This study treats information-seeking activity from the pint of view of economic exchange in which benefit and cost are the main concern. The model proposed only the cost-benefit analysis related to the Website, as an exchange medium, design elements from the seekers' side. The model explains 43% of the variance in intention to purchase. In order to improve

the explanatory power of the model, the future study needs to incorporate not only constructs related to the exchange medium, but also constructs that can be use to analyze the cost-benefit pertaining to the actors involved in the exchange transaction, i.e. of information providers and information seekers.

- Perceived Web search benefit and perceived Web search cost were derived from the Web design elements that fall into motivators and hygiene factors (Zhang and von Dran 2000). Due to the limited empirical studies in which the two-factor model was employed, revalidation of this model to obtain a better picture of what constitute the benefit and the cost related to Web design elements is necessary.
- Two formative latent constructs have been used in this study. Although the predictive validity of these two latent variables was sufficient, because these two latent variables were used without their counterpart, the reflective measures, the predictive capability of these variables was only applicable to that block of measures (Mathieson et al. 2001). As such, the future study should incorporate the reflective measures of these variables, called a redundancy model, to have a better predictive validity and its substitutability in a nomological network.
- Although undergraduate students were not necessarily poor choice for experimental subjects (DeSanctis 1989), because at least they tend to have more open attitude toward the technology, to obtain better external validity, this study can be replicated by employing more general subjects from different populations. Although it may not be an easy task to identify

potential online buyers and to ask them to participate in the replication study, such a study is worth trying.

- This study applies a dichotomous scale to differentiate the planned group from the unplanned group that result in low R^2 values for both online benefit and online cost. A future study could use a different scale, e.g. a 7-point scale such that the true and logical relationship between seeking strategy and online benefit as well as online cost can be established.
- The experiment took two extreme sides of information seeking strategy derived from analytical and browsing strategy, respectively (Marchionini 1995). At one extreme side, subjects in the unplanned group were allowed to move around the Website freely without following any search plan. At the other extreme side, the movement of the subjects in the planned group was constrained to follow search plans strictly, although these subjects were freed to make up their own search plans. However, based on the situated action theory (Suchman 1987), the subjects might not follow their own plans strictly or might not follow any plan at all. Instead, subjects would follow an initial plan, however simple the plan is, but this plan might be changed during the course of the search activity due to the changing Website environment. So, a future study can study the phenomenon stated by Suchman, i.e. how changes in search strategy influence online purchase intention.
- It was mentioned on the limitation that cognitive style was not included in the research model. We argue that cognitive style would have an effect on the overall result. As such, this study could be further enhanced by incorporating cognitive style into the research model, i.e. by having 2x2

(planed and unplanned versus top-down and bottom-up) or 2 x 3 (planed and unplanned versus top-down, bottom-up, and mixed) factorial design.

- It was mentioned on the limitation that subjects' activities were not traced. As such, it is impossible to say whether subjects, especially in the planned grouped, really followed their predetermined plans. As such, for future study, incorporating the clickstream into a Website used in the experiment is important as to enable the back tracking of users' information seeking activities.

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APPENDIX A.1
The Task for Practice Session for the Planned Group

Instruction:
Here is the task to exercise before the real experiment starts. Before you start searching, please write down your plan to search for the information about the mentioned product. After finish searching, please write down the answer on the provided space.

Tasks:
You want to buy a new digital camera of any brand, but must have at least 3.2 megapixel resolution and at least 5 times digital zoom. This digital camera must use Secure Digital (SD) memory card. Write down the brand of the digital camera of your choice, its price, and its shipping time.

Your plan (please write in point form):

1. ……
2. ……
3. ……
4. ……
5. ……

Your answer: Brand name/model: ……..….

Price:…… Shipping time ……

APPENDIX A.2
The Task for Practice Session for the Unplanned Group

Instruction:
Here is the task to exercise before the real experiment starts. After finish searching, please write down the answer on the provided space.

Tasks:
You want to buy a new digital camera of any brand, but must have at least 3.2 megapixel resolution and at least 5 times digital zoom. This digital camera must use Secure Digital (SD) memory card. Write down the brand of the digital camera of your choice, its price, and its shipping time.

Your plan (please write in point form):

1. ……
2. ……
3. ……
4. ……
5. ……

Your answer: Brand name/model: ……..….

Price:…… Shipping time ……

APPENDIX A.3
Task Description for the Planned Group

Name: …….

Experiment Tasks – Group A

Here, you are given four tasks to find information about certain products from http://www.amazon.com. For each task, you have to describe (write down clearly) your search plan before you start searching information for respective task, and write down the result on the space provided.

Task 1.
To ease your task of watering your lawn, you want to install sprinklers in your backyard. You are very concern about the packing dimension: it should be less than 12 inches X 12 inches X 12 inches. The sprinklers that you want, must have all metal head, with pulsating features, and have 80 to 100-foot-diameter coverage. Write the complete name of the sprinkler, its price, and shipping time.

Your plan (please write in point form):

1. ……
2. ……
3. ……
4. ……
5. ……

Your answer: Sprinkler name: …….

Price:…… Shipping time ……

Task 2.
For your relaxation, you want to have a new hammock that you can put on your porch. This hammock must have cotton fabrics, its overall length is not exceeding 15 foot, and its body length is not exceeding 8 foot. Write down the hammock name, its price, and from which company this hammock is offered.

Your plan (please write in point form):

1. ……
2. ……
3. ……
4. ……
5. ……

Your answer: Hammock name: …….

Price:…… Shipping time ……

Task 3.
To make your living room looks nicer, you want to have a decorative lamp of halogen type in your living room. Its packaging size should be less than 30 long. Its shade must be 10-15 inches. Write the complete name of this lamp, its price, its shipping time, and its model number.

Your plan (please write in point form):

1. ……
2. ……
3. ……
4. ……
5. ……

Your answer: Lamp name: …….

Price:…… Shipping time ……

Model #: ……

Task 4.
Suppose you are given a freedom to buy any one set of electronic equipment or computer/PDA that you have been dreaming of for so long regardless of the price. Find the item from this Website. Write the complete name / model and shipping time

Your plan (please write in point form):

1. ……
2. ……
3. ……
4. ……
5. ……

Your answer: Item name: …….

Model:…… Shipping time ……

APPENDIX A.4
Task Description for the Unplanned Group

Name: …….

Experiment Tasks – Group B

Here, you are given four tasks to find information about certain product from http://www.amazon.com. Write down the result on the space provided.

Task 1.
To ease your task of watering your lawn, you want to install sprinklers in our backyard. You are very concern about the packing dimension: it should be less than 12 inches X 12 inches X 12 inches. The sprinklers that you want, must have all metal head, with pulsating features, and have 80 to 100-foot-diameter coverage. Write the complete name of the sprinkler, its price, and shipping time.

Your answer: Sprinkler name: …….

Price:…… Shipping time ……

Task 2.
For your relaxation, you want to have a new hammock that you can put on your porch. This hammock must have cotton fabrics, its overall length is not exceeding 15 foot, and its body length is not exceeding 8 foot. Write down the hammock name, its price, and from which company this hammock is offered.

Your answer: Hammock name: …….

Price:…… Shipping time ……

Task 3.
To make your living room looks nicer, you want to have a decorative lamp of halogen type in your living room. Its packaging size should be less than 30 long. Its shade must be 10-15 inches. Write the complete name of this lamp, its price, its shipping time, and its model number.

Your answer: Lamp name: …….

Price:…… Shipping time ……

Task 4.
Suppose you are given a freedom to buy any one set of electronic equipment or computer/PDA that you have been dreaming of for so long regardless of the price. Find the item from this Website. Write the complete name / model and shipping time

Your answer: Item name ……

Model: ……. ……

Shipping time: ……

APPENDIX A.5
Post Experiment Questionnaires

Dear all,

You have just finished your experiment. I hope you enjoyed it as much as I did. Now, please take a few more minutes to answer the following questions. These questions are asking your perception about what you have gathered, experienced, and perceived during the experiment. There is no right or wrong answer. So, please answer **ALL** questions honestly to the best of your knowledge. **Do not skip any question**. Please read the instruction very carefully. For every group of questions, they may have different instructions.

> ***Notice****:*
> *All information you provide below is only for this research/experiment purpose only, and will not be shared with or distributed to the third parties without your consent.*

Manipulation check (for the Pilot Study)

Please complete the following sentences by putting a cross (X) on the box below 1-7, where **1** means ***Very seldom***, and **7** means ***Very frequently***.

No.	Manipulation check	1	2	3	4	5	6	7
1.	I …….. used ***search engine*** provided on the Website							
2.	I …….. used ***browsing*** strategy to find information on this Website.							
3.	I …….. used ***searching*** strategy to find information on this Website							
4.	I …….. used ***top-down*** (general-to-specific) approach to find information on this Website.							
5.	I …….. used ***bottom-up*** (specific-to-general) approach to find information on this Website.							

Manipulation check (for the Real Experiment)

No.	Manipulation check	1	2	3	4	5	6	7
1.	I ……. used ***trial-and-error*** approach to find information on this Website.							

I. Please complete the following sentences by putting a cross (X) on the box below 1-7, where 1 means *No experience*, and 7 means *Extensive experience*.

No.	User Internet Experience	1	2	3	4	5	6	7
1.	My level of experience of using the Internet is ……							
2.	My level of experience of using the Internet to search for information is …….							
3.	My level of experience of using search engine to search for information is …….							

II. Please state your agreement or disagreement on the following statements by putting a cross (X) on the box below 1-7, where 1 means *Strongly disagree*, 7 means *Strongly agree*.

No.	Motivators and Hygiene factors	1	2	3	4	5	6	7
1.	I have learned ***new knowledge*** from this Website							
2.	I have learned ***new skills*** from this Website							
3.	It was ***fun*** exploring this Website							
4.	I ***enjoyed*** exploring this Website							
5.	This Website **features** a ***multimedia*** presentation							
6.	This Website is owned by a ***reputable*** person/company							
7.	This Website has achieved ***external recognition*** (e.g. visitor counter, awards)							
8.	This Website has an ***attractive appearance***							
9.	This Website is ***visually appealing***							
10.	This Website gives a ***very fast response/loading time***							
11.	This Website supports ***different browsers***							
12.	This Website has a ***loading/processing indicator***							
13.	This Website provides an ***effective*** navigation aids							
14.	This Website provides a ***clear direction*** for navigating the Website							
15.	This Website gives a ***clear indication of user location*** for navigating the Website							
16.	This Website provides information on ***how*** user's information is collected							
17.	This Website provides information on how collected user's information ***will be used***							
18.	This Website gives assurance that user's information will be ***transmitted securely***							
19.	This Website provides an ***access requirement*** (e.g. password) to allow user to access sensitive information.							

III. For the following, please put a cross (X) on the appropriate box to finish the following sentences:

1. *After using this Website, I feel that using this Website is ……*

	Extremely			Neutral			Extremely	
Essential								Nonessential
Fundamental								Trivial
Significant								Insignificant
Important								Unimportant
Needed								Not needed
Means a lot								Means nothing
Relevant								Irrelevant

2. *Considering all design factors I have perceived from the Website I just used, my using this Website to buy things online is ……*

	Extremely			Neutral			Extremely	
Foolish								Wise
Harmful								Beneficial
Negative								Positive
Unfavorable								Favorable
Dislike								Like
Bad idea								Good idea
Terrible								Terrific

IV. For the following statements, please state your agreement/disagreement by putting a cross (X) on the box below 1-7, where 1 means *Strongly disagree*, and 7 means *Strongly agree*.

No.	**Satisfaction**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1.	I feel satisfied with the quality of this Website							
2.	I have control over what I wanted to do on this Website							
3.	I feel satisfied with my visit to this Website							
4.	I feel pleased with my visit to this Website							

No.	Online Purchase Intention	1	2	3	4	5	6	7
1.	The ***probability of me buying*** the product on this website would be high							
2.	The ***likelihood*** that I would purchase the product is high							
3.	My ***willingness to buy*** the product is high							
4.	The probability that I would ***consider buying*** the product is high							

Demographic

Instruction: Please circle ONE option from those items with *) that are applicable to you.

Group*) : A / B

Name : _____

Sex *) : Male / Female

Age group *): a. < 18 years old
b. 18 <= Age < 20 years old
c. 20 <= Age < 23 years old
d. 23 <= Age < 26 years old
e. Age >= 26 years old

Level*) : Year 1 / Year 2 / Year 3 / Honor Student

Faculty: _____

Email address: _____

Thank you very much for your participation on this experiment. Your helps are very much appreciated. Should you have any question regarding this experiment and/or its result, please send your queries to santosa@comp.nus.edu.sg, I will reply your queries promptly.

APPENDIX B
Descriptive Statistics

	N	Mean		Standard Deviation	Variance
		Statistic	Std. Error		
UIE1	235	5.323	0.064	0.981	0.963
UIE2	235	5.162	0.074	1.132	1.281
UIE3	235	5.234	0.081	1.241	1.539
Overall Internet Experience	235	5.240	0.066	1.012	1.023
PWSB1	235	4.464	0.094	1.439	2.070
PWSB2	235	3.979	0.094	1.440	2.072
PWSB3	235	4.626	0.104	1.589	2.526
PWSB4	235	4.587	0.100	1.529	2.337
PWSB5	235	3.800	0.105	1.609	2.588
PWSB6	235	5.353	0.084	1.287	1.657
PWSB7	235	5.213	0.085	1.297	1.681
PWSB8	235	4.289	0.091	1.396	1.950
PWSB9	235	4.302	0.093	1.426	2.032
Cognitive (PWSB1, PWSB2)	235	4.221	0.082	1.250	1.562
Enjoyment (PWSB3 – PWSB5)	235	4.338	0.083	1.279	1.635
Credibility (PWSB6, PWSB7)	235	5.283	0.072	1.107	1.226
Visual appearance (PWSB8, PWSB9)	235	4.296	0.088	1.353	1.830
Overall benefit (PWSB1 – PWSB9)	235	4.513	0.056	0.865	0.749
PWSC1	235	2.426	0.078	1.197	1.434
PWSC2	235	3.004	0.080	1.221	1.491
PWSC3	235	3.753	0.099	1.513	2.289
PWSC4	235	3.289	0.085	1.301	1.694
PWSC5	235	3.579	0.093	1.428	2.040
PWSC6	235	3.579	0.091	1.401	1.963
PWSC7	235	4.051	0.100	1.532	2.348
PWSC8	235	4.357	0.098	1.505	2.265
PWSC9	235	3.864	0.103	1.585	2.511
PWSC10	235	4.047	0.122	1.868	3.489
Technical aspect (PWSC1 – PWSC3)	235	3.061	0.057	0.871	0.759
Navigation (PWSC4 – PWSC6)	235	3.482	0.073	1.119	1.252
Privacy & security (PWSC7 – PWSC10)	235	4.080	0.075	1.153	1.328
Overall cost (PWSC1 – PWSC10)	235	3.595	0.048	0.742	0.550

APPENDIX B
Descriptive Statistics (cont.)

	N	Mean		Standard Deviation	Variance
		Statistic	Std. Error		
UINV1	235	4.349	0.080	1.225	1.502
UINV2	235	4.230	0.087	1.333	1.776
UINV3	235	4.489	0.081	1.245	1.550
UINV4	235	4.187	0.091	1.396	1.948
UINV5	235	4.472	0.094	1.436	2.062
UINV6	235	4.098	0.091	1.394	1.943
UINV7	235	4.826	0.092	1.405	1.974
Overall Involvement	235	4.397	0.067	1.027	1.055
ATOP1	235	4.468	0.076	1.170	1.370
ATOP2	235	4.664	0.072	1.103	1.216
ATOP3	235	4.655	0.076	1.171	1.372
ATOP4	235	4.553	0.084	1.288	1.658
ATOP5	235	4.540	0.089	1.366	1.865
ATOP6	235	4.787	0.093	1.422	2.023
ATOP7	235	4.409	0.072	1.103	1.217
Overall Attitude	235	4.582	0.064	0.988	0.977
USAT1	235	4.698	0.083	1.277	1.631
USAT2	235	4.643	0.092	1.411	1.991
USAT3	235	4.681	0.088	1.354	1.834
USAT4	235	4.672	0.088	1.355	1.837
Overall Satisfaction	235	4.673	0.076	1.169	1.367
OPI1	235	3.566	0.104	1.588	2.520
OPI2	235	3.519	0.102	1.559	2.430
OPI3	235	3.809	0.102	1.567	2.455
OPI4	235	4.260	0.107	1.637	2.680
Overall Intention	235	3.788	0.094	1.437	2.065

APPENDIX C

The structural model for PLS estimation

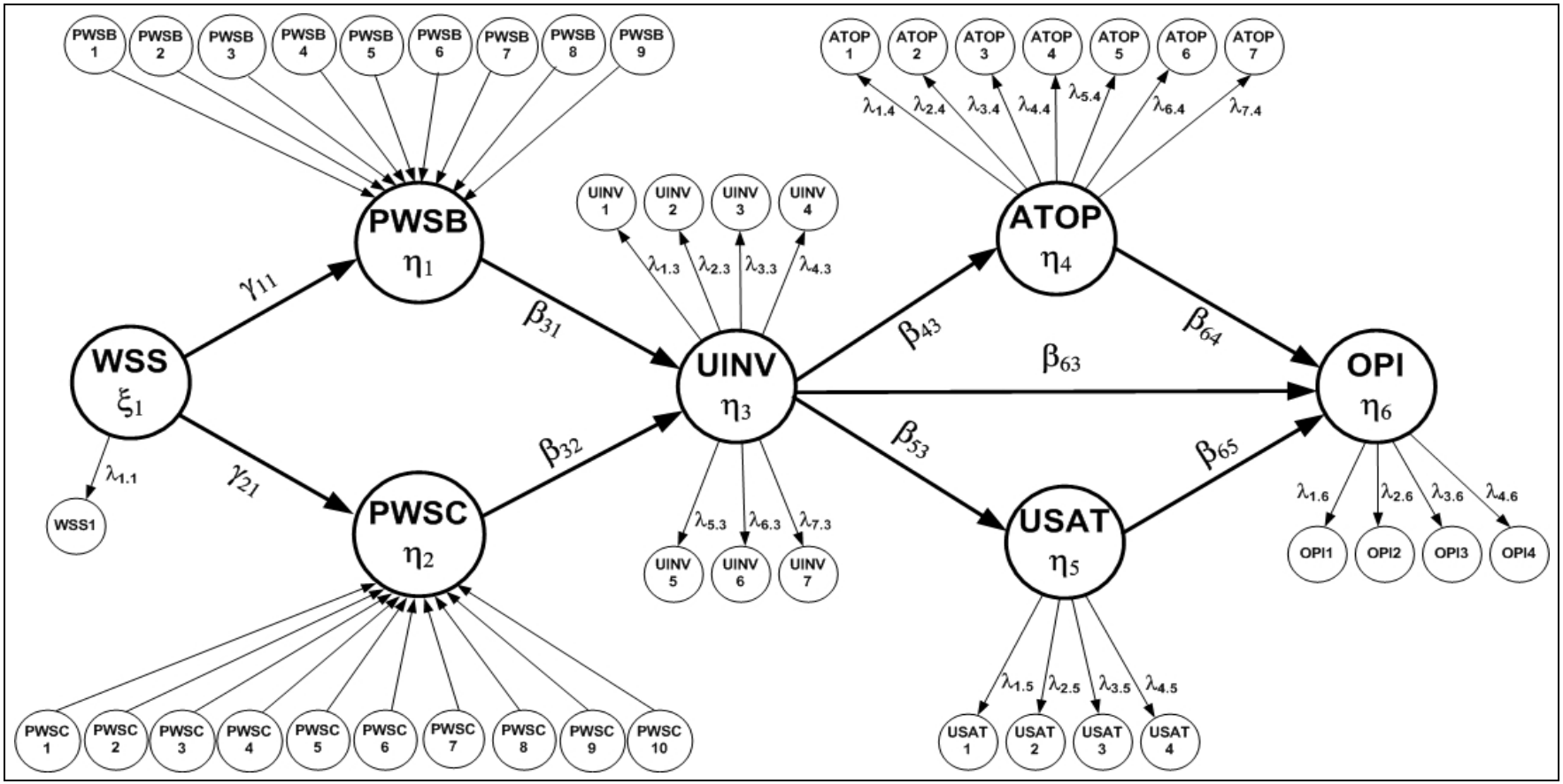

Figure C.1 The main model.

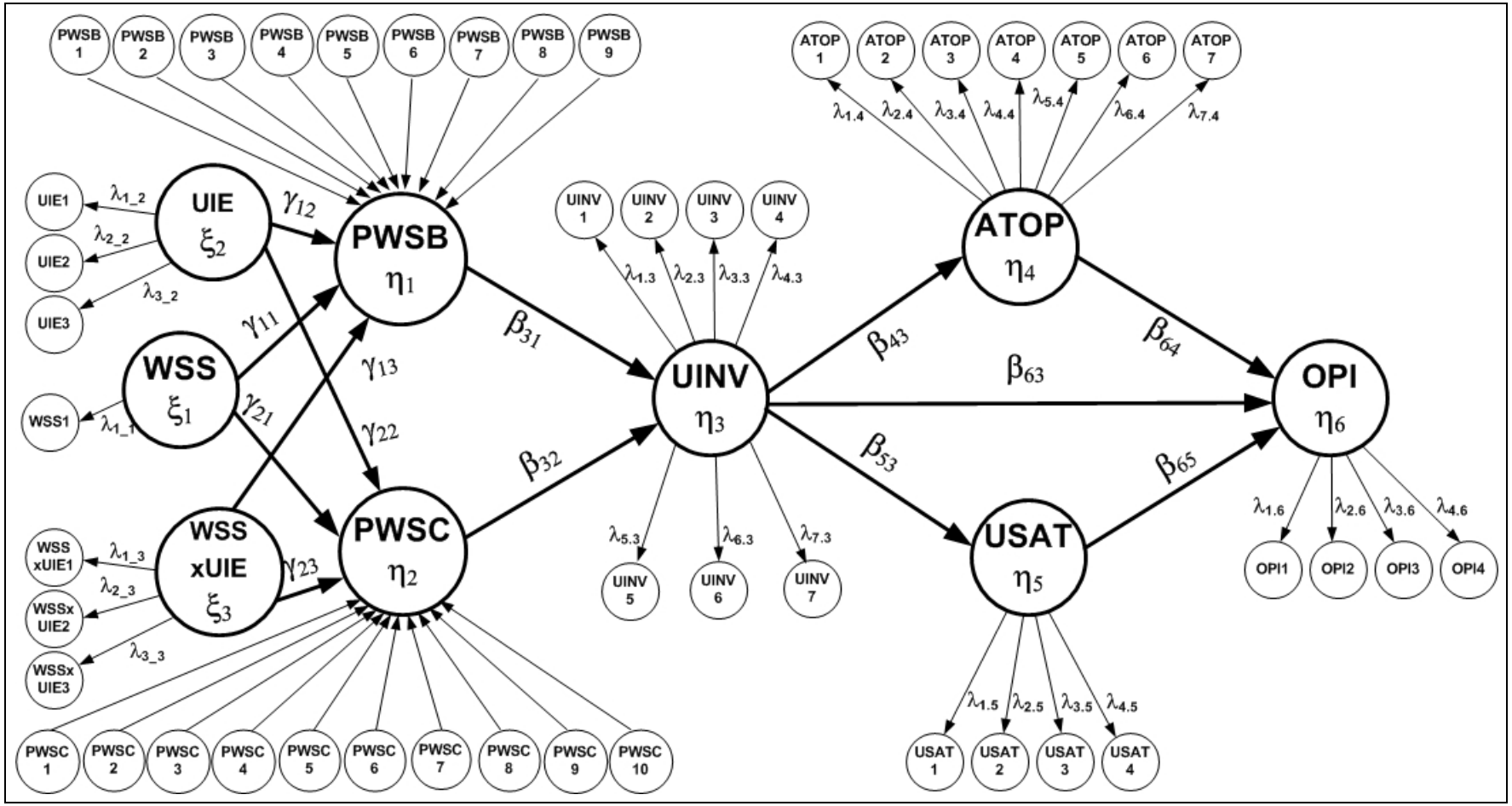

Figure C.2 The interaction model.

Appendix D

STATISTICS FROM THE PILOT STUDY

Table D.1. Descriptive statistics for user Internet experience.

Item	Group	N	Mean	Std. Deviation	Std. Error Mean
UIE1	PG	15	5.00	1.134	0.293
	UPG	15	5.47	1.060	0.274
UIE2	PG	15	4.93	1.033	0.267
	UPG	15	5.47	0.990	0.256
UIE3	PG	15	5.20	1.014	0.262
	UPG	15	5.60	0.986	0.254
Combined Items	PG	15	5.04	0.999	0.258
	UPG	15	5.51	0.916	0.237

Table D.2. The comparison of user Internet experience in the PG group and the UPG group (Equal variances assumed).

Items	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
UIE1	0.031	0.862	-1.164	28	0.254	-0.467	0.401
UIE2	0.088	0.769	-1.444	28	0.160	-0.533	0.369
UIE3	0.465	0.501	-1.095	28	0.283	-0.400	0.365
Combined items	0.340	0.565	-1.334	28	0.193	-0.467	0.350

Table D.3. Descriptive statistics for the manipulation check items

Item	Group	N	Mean	Std. Deviation	Std. Error Mean
MC1	PG	15	6.07	1.100	0.284
	UPG	15	6.00	1.732	0.447
MC2	PG	15	5.20	1.740	0.449
	UPG	15	4.93	1.710	0.441
MC3	PG	15	5.73	1.710	0.441
	UPG	15	5.47	1.187	0.307
MC4	PG	15	5.20	1.859	0.480
	UPG	15	4.93	1.580	0.408
MC5	PG	15	3.33	1.915	0.494
	UPG	15	3.13	1.506	0.389
Combined Items	PG	15	5.11	1.113	0.287
	UPG	15	4.89	0.709	0.183

Table D.4. The t-test result to separate the PG group from the UPG group (Equal variances assumed).

Items	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
MC1	0.875	0.357	0.126	28	0.901	0.067	0.530
MC2	0.080	0.780	0.423	28	0.675	0.267	0.630
MC3	0.992	0.328	0.496	28	0.624	0.267	0.537
MC4	0.167	0.686	0.423	28	0.675	0.267	0.630
MC5	0.869	0.359	0.318	28	0.753	0.200	0.629
Combined Items	1.221	0.279	0.626	28	0.536	0.213	0.341

Table D.5 Collinearity statistics for perceived Web search benefit

Item	Tolerance	VIF
PWSB1	0.130	7.694
PWSB2	0.154	6.503
PWSB3	0.270	3.708
PWSB4	0.173	5.769
PWSB5	0.473	2.116
PWSB6	0.709	1.411
PWSB7	0.376	2.659
PWSB8	0.291	3.432
PWSB9	0.371	2.696

Table D.6 Collinearity statistics for perceived Web search cost

Item	Tolerance	VIF
PWSC1	0.780	1.283
PWSC2	0.632	1.582
PWSC3	0.478	2.092
PWSC4	0.342	2.920
PWSC5	0.234	4.271
PWSC6	0.344	2.909
PWSC7	0.330	3.032
PWSC8	0.424	2.360
PWSC9	0.374	2.677
PWSC10	0.416	2.404

Appendix E

STATISTICS FROM THE REAL EXPERIMENT

Table E.1 Descriptive statistics for User Internet Experience.

Item	Group	N	Mean	Std. Deviation	Std. Error Mean
UIE1	PG	117	5.31	0.995	0.092
	UPG	118	5.34	0.972	0.089
UIE2	PG	117	5.14	1.181	0.109
	UPG	118	5.19	1.086	0.100
UIE3	PG	117	5.07	1.337	0.124
	UPG	118	5.40	1.118	0.103
Combined Items	PG	117	5.17	1.065	0.098
	UPG	118	5.31	0.960	0.088

Table E.2 The comparison of user Internet experience in PG the group and the UPG group (Equal variances assumed).

Items	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
UIE1	0.005	0.946	-0.244	233	0.808	-0.031	0.128
UIE2	0.140	0.709	-0.336	233	0.737	-0.050	0.148
UIE3	0.991	0.321	-2.052	233	0.041	-0.330	0.161
Combined Items	1.245	0.266	-1.038	233	0.300	-0.137	0.132

Table E.3 Descriptive statistics for user Internet experience from the pilot study and the real experiment.

Items	Group	N	Mean	Std. Deviation	Std. Error Mean
UIE1	Pilot*	30	5.23	1.104	0.202
	Real**	235	5.32	0.981	0.064
UIE2	Pilot*	30	5.20	1.031	0.188
	Real**	235	5.16	1.132	0.074
UIE3	Pilot*	30	5.40	1.003	0.183
	Real**	235	5.23	1.241	0.081
Combined Items	Pilot*	30	5.28	0.971	0.177
	Real**	235	5.24	1.012	0.066

*: Pilot study, **: Real experiment

Table E.4 Comparison of user Internet experience of the subjects from the pilot study and the real experiment (Equal variances assumed).

Items	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
UIE1	0.864	0.353	-0.467	233	0.641	-0.090	0.193
UIE2	0.135	0.713	0.176	233	0.860	0.038	0.217
UIE3	0.917	0.339	0.704	233	0.482	0.166	0.236
Combined Items	0.012	0.913	0.195	233	0.846	0.038	0.195

Table E.5 Collinearity statistics for perceived Web search benefit

Item	Tolerance	VIF
PWSB1	0.678	1.474
PWSB2	0.624	1.604
PWSB3	0.245	4.075
PWSB4	0.231	4.328
PWSB5	0.830	1.205
PWSB6	0.764	1.309
PWSB7	0.687	1.456
PWSB8	0.271	3.694
PWSB9	0.286	3.500

Table E.6 Collinearity statistics for perceived Web search cost

Item	Tolerance	VIF
PWSC1	0.858	1.166
PWSC2	0.856	1.168
PWSC3	0.918	1.090
PWSC4	0.524	1.909
PWSC5	0.450	2.220
PWSC6	0.666	1.502
PWSC7	0.540	1.853
PWSC8	0.538	1.857
PWSC9	0.719	1.390
PWSC10	0.766	1.306

Table E.7 The result of normality test on perceived Web search benefit and perceived Web search cost

Variable	Group	N	Mean		Normality		
			Statistics	Std. Dev.	Test	Statistics	Std. Error
PWSB	PG	117	4.407	0.839	Skewness	-0.202	0.224
					Kurtosis	-0.237	0.444
	UPG	118	4.621	0.881	Skewness	-0.609	0.223
					Kurtosis	0.217	0.442
PWSC	PG	117	3.692	0.765	Skewness	0.037	0.224
					Kurtosis	-0.559	0.444
	UPG	118	3.498	0.709	Skewness	0.112	0.223
					Kurtosis	-0.248	0.442

Table E.8 The result of t-test on perceived Web search benefit and perceived Web search cost (Equal variances assumed).

Variable	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PWSB	0.329	0.567	-1.933	233	0.054	-0.217	0.112
PWSC	1.210	0.272	2.017	233	0.045	0.194	0.096

Table E.9.a Convergent validity of the main model.

Latent Variable	Manifest Variable	Item Reliability (λ)	Internal Consistency (ρ_ξ) or (ρ_η)
WSS (ξ_1)	WSS1	1.000	1.000
UINV (η_3)	UINV1	0.813	0.914
	UINV2	0.711	
	UINV3	0.781	
	UINV4	0.812	
	UINV5	0.845	
	UINV6	0.757	
	UINV7	0.706	
ATOP (η_4)	ATOP1	0.749	0.925
	ATOP2	0.746	
	ATOP3	0.828	
	ATOP4	0.817	
	ATOP5	0.863	
	ATOP6	0.867	
	ATOP7	0.711	
USAT (η_5)	USAT1	0.887	0.925
	USAT2	0.710	
	USAT3	0.927	
	USAT4	0.937	
OPI (η_6)	OPI1	0.918	0.948
	OPI2	0.929	
	OPI3	0.892	
	OPI4	0.882	

Table E.9.b Convergent validity of the interaction model.

Latent Variable	Manifest Variable	Item Reliability (λ)	Internal Consistency (ρ_ξ) or (ρ_η)
WSS (ξ_1)	WSS1	1.000	1.000
UIE (ξ_2)	UIE1	0.826	0.926
	UIE2	0.943	
	UIE3	0.922	
WSSxUIE (ξ_3)	WSS1xUIE1	0.895	0.931
	WSS1xUIE2	0.943	
	WSS1xUIE3	0.872	
UINV (η_3)	UINV1	0.813	0.914
	UINV2	0.712	
	UINV3	0.781	
	UINV4	0.811	
	UINV5	0.845	
	UINV6	0.756	
	UINV7	0.707	
ATOP (η_4)	ATOP1	0.749	0.925
	ATOP2	0.747	
	ATOP3	0.828	
	ATOP4	0.817	
	ATOP5	0.863	
	ATOP6	0.867	
	ATOP7	0.711	
USAT (η_5)	USAT1	0.887	0.925
	USAT2	0.710	
	USAT3	0.927	
	USAT4	0.937	
OPI (η_6)	OPI1	0.918	0.948
	OPI2	0.929	
	OPI3	0.892	
	OPI4	0.882	

Table E.10.a Loading and cross loading of the main model.

Construct	Items	WSS (ξ_1)	UINV (η_3)	ATOP (η_4)	USAT (η_5)	OPI (η_6)
Info. Seeking Strategy (WSS)	WSS1	1.000	0.135	0.125	0.172	0.076
User Involvement (UINV)	UINV1	0.096	0.813	0.436	0.398	0.316
	UINV2	0.114	0.711	0.361	0.346	0.272
	UINV3	0.139	0.781	0.407	0.346	0.351
	UINV4	0.103	0.812	0.332	0.359	0.295
	UINV5	0.067	0.845	0.470	0.366	0.348
	UINV6	0.101	0.757	0.316	0.295	0.292
	UINV7	0.113	0.706	0.453	0.400	0.403
Attitude toward Online Purchase (ATOP)	ATOP1	0.151	0.456	0.749	0.429	0.469
	ATOP2	0.090	0.302	0.746	0.315	0.487
	ATOP3	0.063	0.395	0.828	0.339	0.479
	ATOP4	0.170	0.431	0.817	0.368	0.468
	ATOP5	0.058	0.457	0.863	0.468	0.573
	ATOP6	0.127	0.429	0.867	0.422	0.521
	ATOP7	0.037	0.418	0.711	0.364	0.398
User Satisfaction (USAT)	USAT1	0.145	0.447	0.442	0.887	0.439
	USAT2	0.201	0.280	0.272	0.710	0.296
	USAT3	0.155	0.408	0.470	0.927	0.480
	USAT4	0.124	0.460	0.474	0.937	0.499
Online Purchase Intention (OPI)	OPI1	0.087	0.363	0.594	0.467	0.918
	OPI2	0.059	0.406	0.560	0.443	0.929
	OPI3	0.079	0.385	0.513	0.436	0.892
	OPI4	0.049	0.385	0.538	0.472	0.882

Table E.10.b. Loading and cross loading of the interaction model.

Construct	Item	WSS (ξ_1)	UIE (ξ_2)	WSSxUIE (ξ_3)	UINV (η_3)	ATOP (η_4)	USAT (η_5)	OPI (η_6)
Info. Seeking Strategy (WSS)	WSS1	1.000	0.073	-0.001	0.135	0.125	0.172	0.076
User Internet Experience (UIE)	UIE1	0.016	0.826	-0.056	-0.097	0.022	0.033	0.009
	UIE2	0.022	0.943	-0.083	-0.096	0.079	0.050	0.015
	UIE3	0.133	0.922	-0.123	0.003	0.038	0.061	0.019
Interaction (WSSxUIE)	WSS1xUIE1	0.000	-0.066	0.895	0.146	0.077	0.120	0.121
	WSS1xUIE2	0.000	-0.090	0.943	0.160	0.082	0.125	0.147
	WSS1xUIE3	-0.001	-0.138	0.872	0.047	0.075	0.084	0.058
User Involvement (UINV)	UINV1	0.096	-0.107	0.127	0.813	0.436	0.398	0.316
	UINV2	0.114	-0.109	0.224	0.712	0.361	0.346	0.272
	UINV3	0.139	-0.014	0.095	0.781	0.407	0.346	0.351
	UINV4	0.103	-0.060	0.060	0.811	0.332	0.359	0.295
	UINV5	0.067	-0.072	0.108	0.845	0.470	0.366	0.348
	UINV6	0.101	-0.037	0.046	0.756	0.316	0.295	0.292
	UINV7	0.113	0.058	0.087	0.707	0.453	0.400	0.403
Attitude toward Online Purchase (ATOP)	ATOP1	0.151	0.065	0.161	0.456	0.749	0.429	0.469
	ATOP2	0.090	0.078	0.019	0.302	0.747	0.315	0.487
	ATOP3	0.063	0.050	0.010	0.395	0.828	0.338	0.479
	ATOP4	0.170	0.022	0.083	0.431	0.817	0.368	0.468
	ATOP5	0.058	0.006	0.151	0.457	0.863	0.467	0.573
	ATOP6	0.127	0.066	0.029	0.429	0.867	0.422	0.521
	ATOP7	0.037	0.047	0.008	0.418	0.711	0.364	0.398
User Satisfaction (USAT)	USAT1	0.145	0.036	0.135	0.447	0.442	0.887	0.439
	USAT2	0.201	0.103	0.113	0.280	0.272	0.710	0.296
	USAT3	0.155	0.040	0.113	0.408	0.470	0.927	0.480
	USAT4	0.124	0.042	0.080	0.460	0.474	0.937	0.499
Online Purchase Intention (OPI)	OPI1	0.087	0.026	0.148	0.363	0.594	0.467	0.918
	OPI2	0.059	-0.035	0.105	0.406	0.560	0.443	0.929
	OPI3	0.079	0.030	0.099	0.385	0.513	0.436	0.892
	OPI4	0.049	0.042	0.104	0.385	0.538	0.472	0.882

Table E.11.a Square-rooted AVE and correlation among constructs in the main model.

Construct	WSS	UINV	ATOP	USAT	OPI
WSS	**1.000**				
UINV	0.135	**0.776**			
ATOP	0.125	0.519	**0.799**		
USAT	0.172	0.467	0.487	**0.870**	
OPI	0.076	0.424	0.610	0.502	**0.905**

Table E.11.b Square-rooted AVE and correlation among constructs in the interaction model.

Construct	WSS	UIE	WSSxUIE	UINV	ATOP	USAT	OPI
WSS	**1.000**						
UIE	0.073	**0.898**					
WSSxUIE	-0.001	-0.104	**0.904**				
UINV	0.135	-0.060	0.139	**0.776**			
ATOP	0.125	0.058	0.087	0.519	**0.799**		
USAT	0.172	0.057	0.124	0.467	0.487	**0.870**	
OPI	0.076	0.017	0.127	0.425	0.610	0.502	**0.905**

Table E.12.a R^2 Change for Perceived Web search benefit

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1*	0.125	0.016	0.011	6.161	0.016	3.671	1	233	0.057
2#	0.222	0.049	0.037	6.081	0.034	4.108	1	232	0.018

*Model 1: PWSB is regressed on WSS
#Model 2: PWSB is regressed on WSS, UIE and WSS*UIE

Table E.12.b R^2 Change for Perceived Web search cost

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1*	0.131	0.017	0.013	7.371	0.017	4.069	1	233	0.045
2#	0.234	0.055	0.042	7.260	0.038	4.586	1	232	0.011

*Model 1: PWSC is regressed on WSS
#Model 2: PWSC is regressed on WSS, UIE and WSS*UIE

Table E.13 Convergent validity for three different datasets.

		Combined Dataset		**PG Group**		**UPG Group**	
Latent Variable	Manifest Variable	Item Reliability (λ)	Internal Consistency (ρ)	Item Reliability (λ)	Internal Consistency (ρ)	Item Reliability (λ)	Internal Consistency (ρ)
UINV	UINV1	0.813	0.914 (0.901)*	0.793	0.908 (0.888)*	0.829	0.916 (0.915)*
	UINV2	0.711		0.698		0.717	
	UINV3	0.781		0.732		0.815	
	UINV4	0.812		0.813		0.806	
	UINV5	0.845		0.870		0.823	
	UINV6	0.757		0.758		0.748	
	UINV7	0.706		0.682		0.725	
ATOP	ATOP1	0.749	0.925 (0.905)*	0.789	0.925 (0.904)*	0.701	0.924 (0.905)*
	ATOP2	0.746		0.761		0.731	
	ATOP3	0.828		0.845		0.815	
	ATOP4	0.817		0.773		0.850	
	ATOP5	0.863		0.845		0.884	
	ATOP6	0.867		0.841		0.887	
	ATOP7	0.711		0.731		0.695	
USAT	USAT1	0.887	0.925 (0.889)*	0.889	0.926 (0.887)*	0.882	0.918 (0.883)*
	USAT2	0.710		0.736		0.643	
	USAT3	0.927		0.917		0.936	
	USAT4	0.937		0.930		0.947	
OPI	OPI1	0.918	0.948 (0.926)*	0.920	0.956 (0.938)*	0.917	0.935 (0.908)*
	OPI2	0.929		0.939		0.915	
	OPI3	0.892		0.912		0.860	
	OPI4	0.882		0.905		0.847	

* Cronbach's alpha score for comparison purpose

Table E.14 Loading and cross loading for three different datasets.

		Combined Data				PG Group				UPG Group			
Construct	**Item**	**UINV**	**ATOP**	**USAT**	**OPI**	**UINV**	**ATOP**	**USAT**	**OPI**	**UINV**	**ATOP**	**USAT**	**OPI**
User Involvement (UINV)	UINV1	0.813	0.436	0.398	0.316	0.793	0.306	0.478	0.362	0.829	0.544	0.301	0.258
	UINV2	0.711	0.361	0.346	0.272	0.698	0.217	0.423	0.334	0.717	0.488	0.234	0.182
	UINV3	0.781	0.407	0.346	0.351	0.732	0.316	0.387	0.340	0.815	0.472	0.276	0.356
	UINV4	0.812	0.332	0.359	0.295	0.813	0.273	0.359	0.263	0.806	0.373	0.346	0.326
	UINV5	0.845	0.470	0.366	0.348	0.870	0.415	0.403	0.344	0.823	0.516	0.322	0.353
	UINV6	0.757	0.316	0.295	0.292	0.758	0.275	0.296	0.311	0.748	0.337	0.279	0.269
	UINV7	0.706	0.453	0.400	0.403	0.682	0.398	0.423	0.379	0.725	0.496	0.350	0.428
Attitude toward Online Purchase (ATOP)	ATOP1	0.456	0.749	0.429	0.469	0.417	0.789	0.518	0.538	0.475	0.701	0.287	0.371
	ATOP2	0.302	0.746	0.315	0.487	0.240	0.761	0.316	0.510	0.339	0.731	0.296	0.470
	ATOP3	0.395	0.828	0.339	0.479	0.338	0.845	0.389	0.584	0.436	0.815	0.276	0.364
	ATOP4	0.431	0.817	0.368	0.468	0.372	0.773	0.366	0.499	0.460	0.850	0.330	0.425
	ATOP5	0.457	0.863	0.468	0.573	0.338	0.845	0.512	0.644	0.563	0.884	0.413	0.489
	ATOP6	0.429	0.867	0.422	0.521	0.287	0.841	0.435	0.549	0.546	0.887	0.380	0.482
	ATOP7	0.418	0.711	0.364	0.398	0.344	0.731	0.446	0.443	0.479	0.695	0.279	0.351
User Satisfaction (USAT)	USAT1	0.447	0.442	0.887	0.439	0.479	0.479	0.889	0.447	0.398	0.383	0.882	0.421
	USAT2	0.280	0.272	0.710	0.296	0.376	0.228	0.736	0.314	0.127	0.293	0.643	0.246
	USAT3	0.408	0.470	0.927	0.480	0.441	0.558	0.917	0.509	0.354	0.357	0.936	0.432
	USAT4	0.460	0.474	0.937	0.499	0.529	0.549	0.930	0.494	0.376	0.380	0.947	0.499
Online Purchase Intention (OPI)	OPI1	0.363	0.594	0.467	0.918	0.412	0.658	0.456	0.920	0.300	0.517	0.467	0.917
	OPI2	0.406	0.560	0.443	0.929	0.451	0.623	0.457	0.939	0.356	0.489	0.422	0.915
	OPI3	0.385	0.513	0.436	0.892	0.368	0.587	0.470	0.912	0.395	0.426	0.380	0.860
	OPI4	0.385	0.538	0.472	0.882	0.393	0.622	0.506	0.905	0.383	0.444	0.425	0.847

Notes: All loadings are significant at the 0.01 level.

Table E.15 Square-rooted AVE and correlation among constructs

	Combined Data				PG Group				UPG Group			
Construct	**UINV**	**ATOP**	**USAT**	**OPI**	**UINV**	**ATOP**	**USAT**	**OPI**	**UINV**	**ATOP**	**USAT**	**OPI**
UINV	**0.776**				**0.766**				**0.782**			
ATOP	0.519	**0.799**			0.420	**0.799**			0.596	**0.798**		
USAT	0.467	0.487	**0.870**		0.527	0.537	**0.871**		0.388	0.410	**0.861**	
OPI	0.424	0.610	0.502	**0.905**	0.443	0.678	0.513	**0.919**	0.402	0.532	0.480	**0.885**

Table E.16 The formative indicators' weight scores.

Latent Construct	Item	Entire sample	Mean of subsamples	Standard Error	t-value	Sig. (2-tailed)
PWSB	PWSB1	0.326	0.309	0.137	2.373	$p < 0.05$
	PWSB2	-0.128	-0.111	0.135	-0.944	ns
	PWSB3	0.152	0.116	0.259	0.588	ns
	PWSB4	0.450	0.422	0.294	1.531	ns
	PWSB5	0.268	0.258	0.142	1.885	$p < 0.1$
	PWSB6	-0.123	-0.116	0.168	-0.731	ns
	PWSB7	0.195	0.189	0.135	1.442	ns
	PWSB8	-0.242	-0.217	0.177	-1.364	Ns
	PWSB9	0.443	0.417	0.174	2.543	$p < 0.01$
PWSC	PWSC1	0.211	0.147	0.245	0.861	ns
	PWSC2	0.027	0.021	0.167	0.161	ns
	PWSC3	0.315	0.280	0.130	2.415	$p < 0.05$
	PWSC4	0.593	0.518	0.197	3.012	$p < 0.01$
	PWSC5	0.084	0.095	0.229	0.367	ns
	PWSC6	0.132	0.117	0.211	0.628	ns
	PWSC7	-0.274	-0.232	0.192	-1.430	ns
	PWSC8	0.485	0.412	0.203	2.389	$p < 0.05$
	PWSC9	0.099	0.084	0.156	0.636	ns
	PWSC10	-0.092	-0.076	0.144	-0.635	ns

ns: not significant